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ABSTRACT

This curriculum guide provides aid in organizing and planning for the mathematical needs of the individual classroom. It is recommended that: (1) each teacher study the entire curriculum to become familiar with the concepts that interlock and blend all the grades together, and (2) all students with average ability master 70% of the skills. The guide notes the educational philosophy of Portales, New Mexico; Mathematics Department objectives; departmental policies and procedures; and methods available for pupil evaluation. The scope and sequence of the mathematics curriculum in Portales High School is noted, followed by a brief outline of the basic skills to be mastered in kindergarten through grade six. The bulk of the document notes educational objectives for specific concepts at each grade level and course throughout the program, and provides guidance on expected learner outcomes, suggested materials and/or methods, and means of student evaluation. (MP)

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MATHEMATICS GUIDE K - 12

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Prepared by

Mathematics Articulation and Curriculum Committee

1980

Portales Public Schools

Portales, New Mexico

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SE036 439

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PREFACE

The following mathematics curriculum guide is presented to the teachers of elementary and secondary mathematics in the hope that it may be of assistance in the organization and planning for the mathematical needs of the individual classroom.

It is recommended that each teacher study the entire curriculum so that he may become familiar with the concepts that interlock and blend all of the grades together.

The committee recommends that all students with average ability must master 70% of these skills. If unable to master 70% of the skills, it is recommended that a student be directed to summer school and/or special programs in addition to his regular program in mathematics.

PHILOSOPHY

Every child in Portales has a right to an education and this education should include those skills basic to mathematics. The child has a right to feel secure in his surroundings, to expect help and sympathetic understanding in his search for knowledge and to participate in a mathematics program which will challenge his ability. Mathematics education should involve not only pleasure in the challenge of learning but a mastery of a minimal level of basic mathematics.

The steps in intellectual development move from concrete objects to abstract symbols and from sensory contact to intuition and deduction. The child should be helped, not forced, through the process. We need to recognize the value of student-to-student interaction and of student-to-teacher communication. Meeting the individual needs of students, even though it increases the workload of the teacher, is recognized as desirable.

This philosophy is in keeping with the philosophy of the New Mexico State Department of Education.

Mathematics Department

Objectives

1. To encourage students to solve problems on the basis of logical analysis and clear thinking.
2. To help students develop understanding and skill in basic mathematical operations.
3. To give students an opportunity to discover relations and to understand and appreciate the underlying structure of mathematics.
4. To help students develop the ability to understand and use graphs, tables, formulas, mathematical symbols and sentences for the development and presentation of ideas.
5. To help students see and appreciate mathematics' role in careers and everyday life.
6. To promote habits of regularity of study, concentration and orderliness and to show why, due to its sequential nature, this is necessary in the study of mathematics.
7. To provide a foundation for more advanced mathematics.

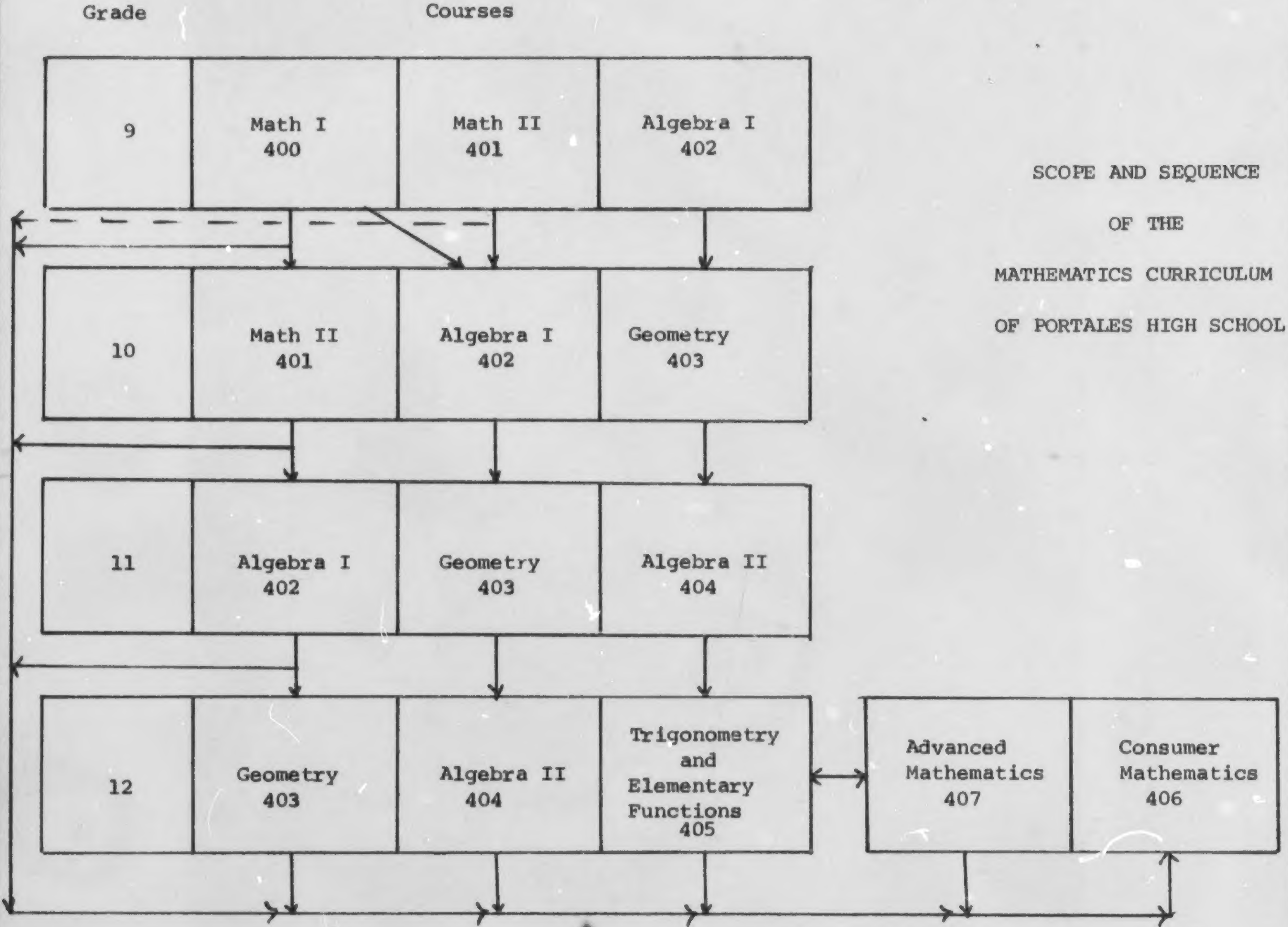
DEPARTMENTAL POLICIES AND PROCEDURES

1. Students in K-8 shall complete the prescribed mathematics for their grade level.
2. It is recommended that ability grouping be implemented when possible on the basis of achievement tests and classroom performance. Placement in ability groups should be flexible.
3. Successful completion of two years of mathematics is required at Portales High School. College-bound students are encouraged to complete mathematics through Algebra II at least.
4. Algebra I is a prerequisite for Geometry.
5. Geometry is a prerequisite for Algebra II.
6. Algebra II is a prerequisite for Trigonometry/Functions.
7. Advanced Mathematics may be taken the same year as Trigonometry/ Functions.
8. Credit for Math I or Math II is not available to students who have successfully completed Algebra I.
9. It is recommended that the best mathematical eighth graders be scheduled into one or two Algebra I classes in the ninth grade on the basis of scores and teacher recommendation.
10. Consumer Mathematics is available to any senior (and possibly juniors on a limited basis).

Evaluation Design

Students are evaluated by one or more of the following ways:

1. Teacher observation
2. Written work
3. Oral interviews
4. Unit and/or chapter tests
5. Teacher prepared tests
6. Standardized tests
7. Iowa Test of Basic Skills (1st-8th grade)
8. California Test of Basic Skills (5th, 8th, 11th grade)
9. Adult Performance Level (10th grade)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SCOPE AND SEQUENCE

OF THE

MATHEMATICS CURRICULUM

OF PORTALES HIGH SCHOOL

KINDERGARTEN

All students with average ability must master 70% of these skills:

I. Classification

- A. Classify objects according to kind, color, shape, size or use.
- B. Determine which of several objects is different.

II. Numbers and Numeration

- A. Recognize numerals 0 to 10.
- B. Rote count to 30.
- C. Copy numerals to 20.
- D. Identify sets that are more, less or same.
- E. Show relationships among numbers of objects, oral number words and the numerals 0 to 10.
- F. Show the order of numerals 0 to 10.
- G. Know ordinals, first through third.
- H. Recognize sets of five or less without counting.

III. Geometry

- A. Identify balls, cans, boxes, cubes and tents.
- B. Identify circles, ovals, rectangles, squares and triangles.

IV. Measurement

- A. Identify length in terms of shorter, longer, taller, shortest, longest or tallest.
- B. Identify volume in terms of container holding more, less, most or least liquid.
- C. Tell time on the hour.
- D. Identify coins: penny, nickel and dime.
- E. Read thermometer.

These skills are measured by the teacher through individual performance tests.

Text: **Macmillan Mathematics**

FIRST GRADE

All students with average ability must master 70% of these skills:

I. Numbers and Numeration

A. Develop a knowledge and understanding of the relationship between numbers of objects and the numerals 0 through 10.
B. Know the order of numerals 0 through 10.
C. Know ordinal numbers first through tenth.
D. Read, recite and write numerals 0 to 100.
E. Identify inequalities of numbers 0 to 100.
F. Develop an awareness of place value, with emphasis on ones and tens.
G. Count by 2's, 5's and 10's to 100.

II. Addition and Subtraction

A. Know basic addition facts with sums of 10 or less.
B. Know basic subtraction facts with first numbers of 10 or less.
C. Add two columns of numerals without regrouping.
D. Subtract two columns of numerals without regrouping.
E. Solve story problems involving numbers 0 through 99 with no regrouping.

III. Geometry

A. Identify balls, cans, boxes, cubes and tents.
B. Identify circles, rectangles, squares and triangles.
C. Identify two dimensional objects which have been cut into two, three or four equal pieces.

IV. Measurement

A. Identify which object is longer, shorter, longest or shortest.
B. Use a ruler to measure length of an object to the nearest inch or centimeter.
C. Identify coins, know their value and find value of a group of coins totaling 99¢ or less.
D. Tell time to the hour and the half hour.
E. Recognize the calendar as a measure of time in days, weeks and months.
F. Compare liquid capacities of cups, pints, quarts and liters.

The Macmillan series provides reinforcement sheets and unit tests. Progress is evaluated here and remedial procedures may need to be implemented. Teacher observation, teacher developed tests, and the Iowa Test of Basic Skills are also used as tools of evaluation.

SECOND GRADE

All students with average ability must master 70% of these skills:

I. Numbers and numeration—0 to 999

  A. Place value—ones, tens, hundreds
  B. Vocabulary-as presented at beginning of each unit in text
  C. Counting by ones to 999
  D. Introduced to skip counting by twos, threes, fours, fives, tens and hundreds.

II. Addition of whole numbers

  A. Basic addition facts- sums of 18 or less
  B. Addition of 2 digit numerals with and without regrouping and sums of 999 or less
  C. Solving addition story problems
  D. Solving addition problems written either horizontally or vertically

III. Subtraction of whole numbers

  A. Basic subtraction facts with first numbers 18 or less
  B. 2-digit numeral subtraction with and without regrouping-first numbers are 99 or less
  C. Using subtraction to solve word problems
  D. Solving subtraction problems written in either horizontal or vertical

IV. Concepts introduced at grade 2

  A. Fractions
  B. Measurement (standard, metric, length, area, time, money, liquid)
  C. Geometry
  D. Math Structure
  E. Graphs-tables

Materials: Basic text—Macmillan Mathematics—Macmillan Co., 1976
Supplementary materials:
Duplicating masters—reinforcement
Duplicating masters—tests
Duplicating masters—parent, child activities
Individual punch-out student materials
Teacher made materials for drill, testing and games

THIRD GRADE

All students with average ability must master 70% of these skills:

I. Numeration (1-4)

- A. Place Value
- B. Counting money
- C. Counting numbers from 0 - 9999
- D. Inequalities-showing which number is greater than or less than

II. Addition (1-4)

- A. Recall of basic addition facts to 20
- B. Find differences when parentheses are used to indicate the order of operations
- C. Find the sum of two numbers with or without regrouping (9000 or less)
- D. To know the relationships of adding vertically as well as horizontally
- E. Use addition to solve story problems
- F. Use addition to check subtraction
- G. Understanding the relationship between addition and subtraction

III. Subtraction (1-4)

- A. Recall of basic subtraction facts
- B. Find differences when parentheses are used to indicate the order of operations
- C. Find the difference of two numbers with or without regrouping (9000 or less)
- D. To know the relationship of subtracting vertically as well as horizontally
- E. Use subtraction to solve story problems
- F. Understanding the relationship between addition and subtraction

IV. Multiplication (1-4)

- A. Understanding relationship between addition and multiplication
- B. Learn basic facts (0-10)
- C. Finding the product of two numbers when the first factor is a 9 or less and the second factor is 999 or less
- D. Use multiplication to solve story problems
- E. Find the products when exercises are mixed and when parentheses are used to indicate the order of operations

V. Division (1-4)

- A. Use basic multiplication facts to find answers to division exercises.
- B. Use division to solve simple story problems
- C. Use division to solve problems with one digit remainders
- D. Use division to solve problems with dividends of not more than two digits

Third Grade continued

VI. Measurement (1-4)

- A. Measure to find lengths and distances
- B. Determine the appropriate unit of measurement

VII. Concepts reinforced but not measured (1-4)

- A. Telling time
- B. Fractions
- C. Tables and graphs
- D. Geometry

Texts Used: Macmillan Mathematics, Macmillaa and Company, 1976

Supplemental materials used:
Skills Practice Book, Macmillan and Company, 1976
Reinforcements Worksheets, Macmillan and Company, 1976
Seeing Through Arithemetic, Addison and Wesley, 1971

Ways of measurement:
1. written work
2. teacher made tests
3. teacher observation
4. unit tests

FOURTH GRADE

All students with average ability must master 70% of these skills:

I. Addition

- A. To know how to
  1. Add three or more addends
  2. Check addition
  3. Use addition to solve simple story problems

- B. To become aware of
  1. Using parentheses
  2. Adding dollars and cents

II. Subtraction

- A. To know how to
  1. Check subtraction by adding
  2. Subtract with zeros
  3. Use subtraction to solve simple story problems
  4. Subtract 4 digit problems

- B. To become aware of
  1. Subtracting with dollars and cents

III. Multiplication

- A. To know how to
  1. Multiply by multiples of 10
  2. Use multiplication to solve simple story problems
  3. Multiply three digits by two digits
  4. Deal with the special properties of zero and one
  5. Apply the basic multiplication facts

IV. Division

- A. To know how to
  1. Use multiplication facts in division
  2. Use zero in division
  3. Deal with the special properties of zero and one
  4. Compute quotients less than 1,000
  5. Compute zeros in the quotient
  6. Check division with multiplication and addition
  7. Use division to solve simple story problems

V. Fractions

- A. To know how to
  1. Name the parts of objects

- B. To become aware of
  1. Finding equivalent fractions
  2. Fractions for parts of sets
  3. Fractions for areas of parts of objects

Fourth grade continued

VI. Geometry-mastery

A. To know how to
1. Recognize rectangles and parallelograms

B. To become aware of
1. Determining number of intersections created by crossing straight lines

VII. Measurement

A. To know how to
1. Determine area by counting squares
2. Determine volume by counting cubes

B. To become aware of
1. Length and distance using the customary units
2. Length and distance using the metric units
3. Perimeter using customary units
4. Determining weight using customary units
5. Determining weight using metric units
6. Computing with customary measures conversions

VIII. Graphs and tables

A. To become aware of
1. Bar graphs
2. Broken-line graphs
3. Data tables
4. Picture graphs
5. Circle graphs

IX. Numbers and numeration

A. To become aware of
1. Place value: millions, thousands, hundreds, tens, ones

Basic text used: Macmillan Mathematics, Macmillan Publishing Co., 1976

FIFTH GRADE

All students with average ability must master 70% of these skills:

I. Place value

- A. Read numerals up to 100 million

II. Addition

- A. Know how to add problems with 6 or less digits in addends
- B. Reinforce checking of addition
- C. Addition as used in story problems
- D. Solving story problems involving money

III. Subtraction

- A. Subtract problems with 6 or less digits
- B. Check subtraction by adding
- C. Subtracting with zero involving 6 or less digits
- D. Using subtraction in solving story problems
- E. Functional knowledge of subtraction as used in multiple steps of story problems

IV. Multiplication

- A. Mastery of basic multiplication facts (through the 12's)
- B. Multiplying three digits by three digits
- C. Solving story problems with multiplication
- D. Checking multiplication by addition

V. Division

- A. Computing problems using two digit divisors and three digit dividends
- B. Checking division by multiplying and adding
- C. Using division in solving story problems

VI. Fractions

- A. Fractional terminology as it applies to computation
- B. Finding equivalent fractions
- C. Reducing fractions to lowest terms
- D. Changing improper fractions to lowest terms and mixed numerals
- E. Addition and subtraction of fractions with common denominators
- F. Cognizant of unlike denominators, mixed numerals, multiplication and division of fractions and story problems dealing with fractions

VII. Decimals

- A. Understanding place value, tenths, hundredths, thousandths
- B. Comparing numbers using decimals
- C. Adding and subtracting decimals including hundred thousandths
- D. Adding and subtracting decimals using dollar notations
- E. Solving dollar notation story problems

Fifth grade continued

VIII. Geometry

A. Functional knowledge of geometric forms and nomenclature

IX. Number concepts

A. Basic understanding of the properties of additive, multiple and distributive property

B. Basic understanding of common factor, greatest common factor, common multiple, least common multiple, prime and composite numbers.

X. Measurement

A. Knowledge of measurement as it applies to customary and metric units

Text: MacMillan Mathematics, MacMillan Publishing Co., 1976

Students may be evaluated by one or more of the following ways:

1. Teacher prepared tests
2. Standardized tests
3. Iowa Basic Skill Test
4. Unit tests
5. California Test of Basic Skills Test
6. Teacher observation
7. Written work

SIXTH GRADE

All students with average ability must master 70% of these skills:

I. Place value

- A. Know how to read a given number from 999,999,999 and a given decimal to millionths
- B. Be able to round off numbers to hundredths and whole numbers to 1,000,000

II. Adding and subtracting

- A. Find the sum or difference of two numbers (each 999,999 or less) when the exercises are mixed
- B. Find the sum of three or more numbers (each 999,999 or less)
- C. Use addition or subtraction to solve story problems when the problems are mixed

III. Multiplication

- A. Find the product of two numbers when one factor is 999 or less and the other factor is 99,999 or less
- B. Use multiplication or other operations to solve story problems when the problems are mixed

IV. Division

- A. Divide a number 999,999 or less by a number 999 or less
- B. Use division or other operations to solve story problems when the problems are mixed

V. Fractions

- A. Be able to find equivalent fractions and to reduce to lowest terms
- B. Be able to add, subtract, multiply or divide fractions or mixed numbers
- C. Be able to add, subtract, multiply or divide fractions or mixed numbers to solve story problems

VI. Decimals

- A. Be able to add or subtract with decimals (to the hundred-thousandths) when exercises are mixed
- B. Be able to multiply with decimals, products to hundred-thousandths
- C. Be able to divide using decimals
- D. Be able to add, subtract, multiply or divide with decimals to solve story problems

Sixth grade continued

VII. Ratio and percents

A. Write a percent or a ratio named by a given decimal or fraction

VIII. Geometry

A. Be able to measure perimeter, area and volume using either English system or metric system
B. Be able to recognize and name basic shapes (square, rectangle, triangle)

Text: Macmillan Mathematics 1976

Measurement and evaluation will include:

1. Teacher prepared tests
2. Iowa Basic Skills Test
3. California Test of Basic Skills
4. Unit tests or chapter tests

Course or Grade Kindergarten

Concept: Classification

Objective: At the conclusion of the unit, the students will display a knowledge of classification. Each student will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Classify objects according to kind, color, shape, size, or use.	1. Blocks, beads, buttons, flannel objects, pictures, Color and Shape Lotto.	1. Individual interviews.
2. Determine which of several objects is different.	2. Blocks, buttons, flannel objects, pictures, ditto sheets, charts.	

Course or Grade Kindergarten

Concept: Numbers and Numeration

Objective: At the conclusion of the unit, the students will display a knowledge of numbers and numeration. Each student will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Recognize and copy numerals from 0 to 20.	1. Flash cards, lotto games, chalkboard.	
2. Rote count to 30.	2. Numeral chart.	2. Individual interviews.
3. Recognize sets of five or less without counting.	3. Blocks, flannel objects, flash cards.	
4. Identify sets that are more, less, or same.	4. Flannel objects, picture blocks.	
5. State relationships among numbers of objects, oral number words, and the numerals 0 to 10.	5. Blocks, fingers, flash cards, finger plays, flannel objects, number line.	
6. State the order of numerals 0 to 10.	6. Number line, numbered objects.	
7. Recognize ordinals, first through third.	7. Pictures, flannel objects.	

Course or Grade Kindergarten

Concept: Geometry

Objective: At the conclusion of the unit, the students will display a knowledge of basic shapes. Each student will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify balls, cans, boxes, cubes, and tents.	1. Objects of each shape, pictures of objects.	
2. Identify circles, ovals, rectangles, squares, and triangles.	2. Flannel objects, pictures, student-made pictures.	

Course or Grade Kindergarten

Concept: Measurement

Objective: At the conclusion of the unit, the students will display a knowledge of measurement. Each student will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify length in terms of shorter, longer, taller, shortest, longest, or tallest.	1. Pencils, ropes, people, pictures.	
2. Identify volume in terms of containers holding more, less, most, or least liquid.	2. Jars, bottles, boxes, cartons, etc. of various sizes.	
3. Tell time on the hour.	3. Real clock, cardboard clocks with moveable hands, student-made clocks.	
4. Identify coins: penny, nickel, and dime.	4. Real coins, play money.	
5. Read thermometer.	5. Thermometer model with moveable "mercury."	

Course or Grade First

Concept: Numbers and Numeration

Objective: At the conclusion of the unit, the students will display a knowledge of numbers and numeration. Each student will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Demonstrate an understanding of the relationship between numbers of objects and the numerals 0 through 10.	1. Blocks, flash cards, flannel objects, pictures, chalkboard, filmstrips, Lotto, games.	
2. State the order of numerals 0 through 10.	2. Number line.	
3. Identify the ordinal numbers first through tenth.	3. Objects of ten or less in a line.	
4. Read, recite, and write numerals 0 to 100.	4. Counting blocks and sticks, number chart, Bingo.	
5. Identify inequalities of numbers 0 to 100	5. Counting sticks, picture cards, number chart.	
6. Identify place value of ones and tens.	6. Counting sticks, picture cards, place value board, pegboards.	
7. Count by 2's, 5's, and 10's to 100.	7. Number line, counting chart, counting sticks or blocks.	

Course or Grade First

Concept: Addition and Subtraction

Objective: At the conclusion of the unit, the students will display a knowledge of addition and subtraction. Each student will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Compute basic addition facts with sums of 10 or less.	1. Blocks, sticks, crayons, number line, flannel board, flash cards, games, filmstrips.	
2. Compute basic subtraction facts with first numbers of 10 or less.	2. Blocks, sticks, crayons, number line, flannel board, flash cards, games filmstrips.	
3. Add two columns of numerals without regrouping.	3. Counting sticks, place value board.	
4. Subtract two columns of numerals without regrouping.	4. Counting sticks, place value board.	
5. Solve story problems involving numbers 0 through 99 with no regrouping.	5. Objects for counting, dramatizations, filmstrips.	

Course or Grade First

Concept: Geometry

Objective: At the conclusion of the unit, the students will display a knowledge of geometry.
Each student will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify balls, cans, boxes, cubes, and tents.	1. Objects of each shape, pictures of objects.	
2. Identify circles, rectangles squares, and triangles.	2. Flannel objects, pictures student-made drawings, "geometric person", Color and Shape Lotto.	
3. Identify two dimensional objects which have been cut into two, three, or four equal parts.	3. Paper shapes, pictures.	

Course or Grade First

Concept: Measurement

Objective: At the conclusion of the unit, the students will display a knowledge of measurement. Each student will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify which object is longer, shorter, longest, or shortest.	1. Pencils, papers, books, and other objects.	
2. Measure the length of an object to the nearest inch or centimeter.	2. Measuring sticks and various objects to measure.	
3. Identify coins, know their value, and find value of a group of coins totaling 99¢ or less.	3. Coins, play money, play store, filmstrips.	
4. Tell time to the hour and half hour.	4. Clock, paper-plate clocks, Tell-Time Quizmo, filmstrip.	
5. Recognize the calendar as a measure of time in days, weeks, and months.	5. Calendar.	
6. Compare liquid capacities of cups, pints, quarts, liters.	6. Containers of each size, water.	

Course or Grade Second

Concept: Addition

Objective: At the conclusion of this unit, the student will display a knowledge of addition. Each student should be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Demonstrate immediate recall of basic addition facts with sums of 18 or less.	1. Textbook, records, flash cards, games, practice sheets, manipulative objects (blocks, sticks, etc.).	
2. Determine sums (99 or less) of three or more numbers with or without regrouping.	2. Textbook, teacher-made practice sheets.	
3. Demonstrate use of addition to check subtraction.	3. Textbook, practice sheets.	
4. Demonstrate use of addition to solve simple story problems.	4. Textbook, practice sheets.	

Course or Grade Second

Concept: Subtraction

Objective: At the conclusion of this unit, the student will display a knowledge of subtraction. Each student should be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Demonstrate immediate recall of basic subtraction facts of 18 or less.	1. Textbook, records, flash cards, games, practice sheets, manipulative objects (blocks, sticks, etc.).	
2. Determine differences (99 or less) with or without regrouping.	2. Textbook, manipulative materials, practice sheets, chalkboard drill.	
3. Demonstrate use of addition to check subtraction.	3. Textbook, practice sheets. Use Buddy system. Have one child do the addition and the other check by subtraction or reverse it.	
4. Demonstrate use of subtraction to solve story problems when problems are mixed.	4. Textbook, practice sheets. Have students make up their own problems.	

Course or Grade Second

Concept: Fractions

Objective: At the conclusion of this unit the student will display a knowledge of fractions. Each student will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify two-dimensional objects that are shaded to represent one-half, one-third, two-thirds, one-fourth, two-fourths, and three-fourths.	1. Textbook, flannel board, commercial materials and objects (real and abstract).	

Course or Grade Second

Concept: Numeration

Objective: At the conclusion of this unit, the student will display a knowledge of place value. Each student should be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify relationship between numbers of ones, tens, hundreds.	1. Textbook, placement materials, practice sheets.	
2. State the meaning of a given digit in a numeral 0-9999.	2. Textbook, numerals, practice sheets.	
3. Distinguish which of two numbers 0-9999 is greater than or less than.	3. Number line, numerals, and greater than and less than symbols.	
4. State order of numbers 0-9999.	4. Counting frames, squared paper, teacher made materials. Have students fill in squared paper with counting numbers.	

Course or Grade Second

Concept: Measurement and Geometry

Objective: At the conclusion of this unit, the student will display a knowledge of measurement and geometry. Each student will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Determ time to the hour, half-hour, or five minute intervals, and record using standard notation.	1. Textbook, practice sheets, chalkboard, and commercial clocks.	
2. Identify a penny, nickle, dime, quarter, half-dollar, and dollar bill and determine value of collection of money ($9.99 or less).	2. Textbook, play money and real money.	
3. Demonstrate use of addition or subtraction to solve simple story problems involving money.	3. Textbook, practice sheets. Play store.	
4. Determine liquid capacities using cups, pints, quarts, or milliliters, and liters.	4. Textbook, measurement utensils, sand, water. Let the student see if more is in the pint or cup.	
5. Identify circles, rectangles squares, and triangles.	5. Textbook, teacher-made materials. Have students collect objects with different shapes and make bulletin board.	
6. Demonstrate the use of arbitrary units to find length, area, and volume.	6. Ruler, yardstick, square, blacks, grid paper. Have students measure different objects in classroom.	

Course or Grade Third

Concept: Addition

Objective: At the conclusion of this unit, the student will display a knowledge of addition. Each student will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. State basic addition facts to sums of 20.	1. Textbook, flashcards, records, games, chalkboard drill, relays, SRA Arithmetic Kit, manipulative objects.	
2. State the sum of two numbers, each 9999 or less, with or without regrouping.	2. Textbook, practice sheets, chalkboard activities.	
3. Demonstrate use of addition or subtraction to solve story problems when problems are mixed.	3. Role-playing, Candy Store, ordering from catalog. Use old catalogs, give each student a certain amount of money and let him order, adding up the total and subtracting from his amount of money. Students make up story problems to give to classmates.	
4. Demonstrate ability to add vertically as well as horizontally.	4. Textbook, practice sheets.	
5. Demonstrate an understanding of the relationship between addition and subtraction.	5. Textbook, practice sheets. Have students check their addition by subtraction and reverse it checking subtraction by addition.	

Course or Grade Third

Concept: Addition

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
6. Determine sums in addition of dollars and cents.	6. Textbook, practice sheets, chalkboard activities, Play store, ordering from catalog. Use old catalogs and let each student have an imaginary amount of money. Student orders, adds up bill, subtracts from his balance.	

Course or Grade Third

Concept: Subtraction

Objective: At the conclusion of this unit, the student will display a knowledge of subtraction. Each student should be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. State all basic subtraction facts.	1. Textbook, flash cards, games, relays, SRA Arithmetic Kit, practice sheets, records, manipulative objects.	
2. Determine the difference of two numbers, each 9999 or less, with or without regrouping.	2. Textbook, chalkboard activities, practice sheets. Students use different colored pencils for each regrouping.	
3. Demonstrate ability to use addition or subtraction to solve story problems when problems are mixed.	3. Role-playing, Candy store, ordering from catalog. Students make up story problems. State them and show calculation.	
4. Demonstrate an understanding of the relationship between addition and subtraction.	4. Textbook, practice sheets. Have students check their addition by subtraction and their subtraction by addition.	
5. Demonstrate ability to subtract vertically as well as horizontally.	5. Textbook, practice sheets, chalkboard activities.	
6. Determine differnce in subtraction of dollars and cents.	6. Textbook, practice sheets, chalkboard drill, ordering from catalog, working in candy store.	

Course or Grade Third

Concept: Multiplication

Objective: At the conclusion of this unit, the student will display a knowledge of multiplication.
Each student should be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. State immediate recall of the basic multiplication facts.	1. Textbook, flash cards, Quizmo, records, relays, chalkboard drill, manipulative objects.	
2. Determine product of two numbers when the first factor is 9 or less and the second is 999 or less.	2. Textbook, practice sheets, chalkboard drill.	
3. Demonstrate use of multiplication to solve story problems when problems are mixed.	3. Textbook, practice sheets. Let students make up own story problem, stating it and showing calculation.	
4. State relationship between multiplication and addition.	4. Textbook, practice sheet. Let student use repeated addition to arrive at multiplication product. 2+2+2=3x2=6.	
5. State special properties of zero and one in multiplication.	5. Textbook, practice sheet. Using sets let student see one empty set = 0 = 1 x 0 = 0. Two empty sets = 00 = 2 x 0 = 0.	

Course or Grade Third

Concept: Division

Objective: At the conclusion of this unit, the student will display a knowledge of division. Each student should be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Demonstrate ability to portion 2-89 objects into 1-9 sets with the same given number (1-0) in each.	1. Textbook, SRA Arithmetic Kit, manipulative objects, games, practice sheets, chalkboard activities.	
2. Construct standard notation to record the number of sets and the number of objects left over in division operations.	2. Textbook, practice sheets.	
3. Demonstrate ability to use division in story problems to answer the question, "How many sets?"	3. Textbook, practice sheet, "Sharing Time". Let each child bring something to share (gum, candy corn, etc.). They portion out to class. Class constructs problems using division.	
4. Demonstrate use of multiplication to check division.	4. Textbook, practice sheets. Let students write multiplication fact to prove division. Let students check classmates' problems by multiplication.	

Course or Grade Third

Concept: Measurement

Objective: At the conclusion of this unit, the student will display a knowledge of measurement. Each student will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Determine time to the minute and record it using standard notation.	1. Textbook, practice sheets, clocks, flannel board cut-outs, Tell Time, Quizmo.	
2. Determine elapsed time between two given times.	2. Individual clocks, story situations. Let children make up time problems and use clock worksheet to record "How many minutes between ___and ___?"	
3. Demonstrate ability to find lengths and appropriate unit in which to measure length.	3. Rulers (inches and cm.), flannel board, yard sticks, meter stick, arbitrary segments. Measure different things in room.	
4. Demonstrate ability to measure liquid volumes and appropriate unit in which to measure.	4. Measurement utensils (cup, pints, quarts, gallons, milliliter, liter). Measure water, sand, etc. Let children keep count of their milk drinking in cafeteria and at the end of the week figure out in ½ pints, cup, pts. and quarts what they consumed.	
5. Determine temperature in degrees (Fahrenheit and Celsius).	5. Fahrenheit and Celsius thermometers. Let children keep record of daily temperature for a week.	

Course or Grade Third

Concept: Fractions

Objective: At the conclusion of this unit the student will display a knowledge of fraction. Each student should be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Demonstrate knowledge of equal parts, fraction, part, halves, thirds, fourths, fifths, and whole objects.	1. Textbook, magnetic fractional circles, flannel board, kit of fractions, practice sheets. Make models of unit squares cut and labeled to show halves, thirds, fourths, and fifths.	
2. State a fraction for the length or area of a given object.	2. Textbook, practice sheets. Have students divide into equal parts yarn, apples, etc.	
3. Demonstrate the ability, when given a fraction, to select a set with the correctly shaded part.	3. Textbook, practice sheets. Display paper cut-outs that have been marked into 2-5 equal pieces. Let student match pieces with fraction.	

Course or Grade Third

Concept: Geometry

Objective: At the conclusion of this unit, the student will display a knowledge of geometry. Each student should be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Name sphere, cylinder, box, cubes, pyramid, circle, rectangle, square and triangle.	1. Textbook, objects representing shapes. Let students create a bulletin board displaying the different shapes and letting students take turns identifying them.	
2. Identify opened and closed figures.	2. Textbook, yarn, flannel board. Create opened and closed figures on flannel board and let student identify.	
3. Distinguish points that are inside, outside, or on a closed figure.	3. Textbook, practice sheets, flannel board and yarn. Have students tell whether flannel object is inside, outside, or on closed figure made with yarn on flannel board.	

Course or Grade: Third

Concept: Numeration

Objective: At the conclusion of this unit, the student will display a knowledge of numeration. Each student should be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. State the correct numeral 0-999,999 for a given number of thousands, hundreds, tens and ones.	1. Textbook, counting frames, chalkboard oral drill, practice sheets, place value table.	
2. Demonstrate ability to read a numeral 0-999,999.	2. Oral drill.	
3. State the order of number 0-999,999.	3. Grid paper, worksheets. Use skip counting along with single numbers on grid paper.	
4. State which of two or more numbers (0-999,999) is greater than or less than.	4. Textbook, practice sheets, less than or more than symbols, flannel board.	
5. State ordinals (1st to 99th) to describe the position of items in ordered collection.	5. Worksheet, oral drill.	

Course or Grade Fourth

Concept: Addition

Objective: At the conclusion of the unit on addition, students will demonstrate a knowledge addition. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Solve problems involving 3 or more addends each 999,999 or less.	1. Textbook, practice sheets, blackboard activities.	
2. Check addition by changing the order of the addends.	2. Textbook, practice sheets, calculators.	
3. Solve simple story problems involving up to 3 addends each 999,999 or less.	3. A duplicate picture will handed to each class member and students will be given opportunity to write story problems about the picture. The questions will be exchanged with class members and returned to the original owner to be checked.	
4. Find sums in exercises when parentheses are used to indicate the order of operation.	4. Present exercises such as the following and challenge students to put in parentheses to make the sentences true. a. 8897 - 4625 + 1309 = 5581 b. 8897 - 4625 + 1309 = 2963	
5. Add money of different value--coins, dollars.	5. Play money, monopoly, work in Country Store.	5. Observe counting of money in Country Store.

Course or Grade Fourth

Concept: Subtraction

Objective: At the conclusion of this unit, students will demonstrate a knowledge of subtraction. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Check subtraction by adding.	1. Daily math exercises, board relays, calculators.	
2. Work subtraction exercises that necessitate regrouping across 0.	2. Blackboard numeration models. Use a different colored pencil for each regrouping. Use exercises that involve money.	
3. Use subtraction to solve simple story problems.	3. Using a state map, pose addition and subtraction story problems. Use a grocery ad to make up story problems.	
4. Find the difference of two numbers each 999,999 or less.	4. Work through example problems, step by step, on the chalkboard; textbook; use a different colored pencil for each regrouping.	
5. Subtract dollars and cents.	5. Play money; Monopoly; calculator; work in Country Store.	5. Observe counting of money in Country Store.

Course or Grade Fourth

Concept: Multiplication

Objective: At the conclusion of this unit, students will demonstrate a knowledge of multiplication. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Multiply a number 999 or less by 10.	1. Textbook. Present multiplication exercises involving 10 times 1,2, or 3 digit numbers. Have children make up story problems to fit the exercises.	
2. Display immediate recall of basic multiplication facts with factors 9 or less.	2. Multiplication Baseball; flashcards; practice sheets; records; electric correct response car; Little Professor calculator	2. Timed tests on records at various speeds, daily tests until mastery.
3. Use multiplication to solve simple story problems.	3. Have children draw pictures how they get to school. Separate pictures into categories and make chart to show how many children are in each category. Use the information to make up multiplication story problems.	
4. Find the product of two numbers when one factor is 99 or less and the other factor is 999 or less.	4. Use squared paper or turn notebook paper sideways to assist in keeping problems in alignment for adding columns.	

Course or Grade Fourth

Concept: Multiplication

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
5. Deal with the special properties of zero and one.	5. Stress when one of the factors is one, the answer is always the other factor and when one of the factors is zero, the answer is always zero. Math Quizmo; flashcards.	

Course or Grade Fourth

Concept: Division

Objective: At the conclusion of this unit, students will demonstrate a knowledge of division. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use multiplication facts in division.	1. Say one fact at a time and have the children give the product in unison. Then give a fact with missing first number and have the children tell what number is missing. For example: "What number times 7 is 63?" Flashcards.	
2. Solve problems using zero in division.	2. Provide experiences in which 0 is a remainder in the tens step and exercises in which the number of sets of ones is 0.	
3. Deal with the special properties of zero and one.	3. Ask students to group five objects into sets having 0 objects each. Since the objects cannot be used up by forming sets of 0, this exercise cannot be done. Then ask them to group 0 objects into sets having 0 objects each. Since any number of sets can be formed, there is no most sets of 0.	

Course or Grade Fourth

Concept: Division

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Divide a number 999 or less by a number 9 or less when the quotient is 99 or less.	4. Use squared paper or turn notebook paper sideways to assist in keeping problems in alignment.	
5. Compute zeros in the quotient.	5. Stress that it should be noted that when the number of sets of hundred is 0, it is not necessary to record the 0; however, failure to record the 0 for sets of tens or ones produce incorrect answers.	
6. Check division exercises using multiplication and addition.	6. Board relays; Blackboard Baseball; checking daily exercises.	
7. Use division to solve simple story problems.	7. Write division exercises on blackboard. Have children copy them and find quotient and remainder. Then they select one of exercises and write on a separate piece of paper a story problem that can be solved using the division. Children may exchange story problems for solutions.	

Course or Grade Fourth

Concept: Fractions

Objective: At the conclusion of this unit, students will demonstrate a knowledge of fractions. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Write a fraction for a given part of an object.	1. Cut paper into equal parts and color portions; flannel board; practice sheets; cut paper plate in equal portions	

Course or Grade Fourth

Concept: Fractions

Objective: At the conclusion of this unit on fractions, the student will become aware of:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Equivalent fractions.	1. Flannel boards, textbook activity.	
2. Using equivalent fractions to construct or describe parts of sets and to find the number in a given part of a set.	2. Textbook; Fract-O game.	
3. Writing fractions or mixed numerals for the areas of parts of unit object.	3. Give students graph paper. Have them draw a figure of their own. Ask them to choose a fold line outside the figure and show where their figure would land if they folded the paper	

Course or Grade Fourth

Concept: Geometry

Objective: At the conclusion of this unit, students will demonstrate a knowledge of geometry. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify circles, rectangles, squares, and triangles.	1. Collect items of the various shapes for classroom display.	

Course or Grade Fourth

Concept: Geometry

Objective: At the conclusion of this unit on geometry, the student will be aware of:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Determining the number of intersections created by crossing straight lines.	1. Textbook, worksheet.	

Course or Grade Fourth

Concept: Measurement

Objective: At the conclusion of this unit students will demonstrate a knowlege on measurement. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Count to find the area of a given figure in square inches or square centimeters.	1. Use graph paper and draw, different shapes; then determine the area for each shape. Worksheets.	
2. Count to find the volume of a given box in cubic inches or cubic centimeters.	2. Square blocks. Make paper cubes and stack in various shapes.	

Course or Grade Fourth

Concept: Measurement

Objective: At the conclusion of this unit on measurement, the student will become aware of:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Measuring and reporting lengths to the nearest inch, half-inch, quarter-inch, feet, yards, or miles.	1. Measure objects in classroom such as math book, chalkboard, desk, shoe, classroom.	
2. Measuring and reporting lengths to the nearest centimeter, meter or kilometer.	2. Measure objects in classroom such as math book, chalkboard, desk, shoe, classroom.	
3. Determining perimeters using customary units.	3. Measure perimeter of classroom, blackboard, etc. Textbook.	
4. Determining the appropriate customary unit in which to measure and report weights.	4. Ask students to name things they might weigh using ounces, pounds, tons.	
5. Determining the appropriate metric unit in which to measure and report weights.	5. Ask students to name things they might weigh using grams, kilograms.	
6. Using a conversion table and multiplication or division to express measure given in one standard unit in terms of a related standard unit.	6. Bulletin board showing conversion. Worksheets. Have students draw diagrams.	

Course or Grade Fourth

Concept: Graphs/Tables

Objective: At the conclusion of this unit on graphs and tables, the student will become aware of:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Solving one-step problems involving data in paragraph, tabular, or graphical form.	1. Worksheets; library filmstrips and activity sheets; textbook.	
2. Solving problems involving data given in picture and circle graph.	2. Worksheets; library filmstrip and activity sheets; textbook.	

Course or Grade Fourth

Concept: Numbers and Numeration

Objective: At the conclusion of this unit on numbers and numeration, the student will become aware of:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. The correct number of millions, thousands, hundreds, tens, and ones for a given numeral 0-999,999,999.	1. Abacus. Fold strips of tagboard to form four or more squares. Write a digit on each square and fold the strip accordian-fashion. Children manipulate the strip to expose different numbers of digits, then read the resulting numeral.	

Course or Grade Fifth

Concept: Place Value

Objective: At the conclusion of this unit, the students will demonstrate a knowledge of place value. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Write the correct numeral 0-999,999,999 for a given number of millions, thousands, hundred, tens, and ones.	1. Abacus and place value charts.	

Course or Grade Fifth

Concept: Addition

Objective: At the conclusion of this unit, students will demonstrate a knowledge of addition. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find the sum of two numbers, each 999,999 or less.	1. Reinforce combinations; flashcards if necessary; records.	
2. Check addition by changing the order of the addends.	2. Individualized contracts for low group. MacMillan text; Time Machine; work sheets; Hayes Drills and Tests; Prentiss-Hall's Fundamentals of Math worksheets.	
3. Solve story problems involving addition.	3. Try to teach how to take a word problem apart the clue words. Each child makes up problems. Illustrative teacher-made problems.	
4. Solve story problems involving money.	4. Same as for other word problems. New Scholastic Skills Program involving problems of everday life to which student can relate.	

Course or Grade Fifth

Concept: Subtraction

Objective: At the conclusion of this unit, students will demonstrate a knowledge of subtraction. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find the differences of two numbers, each 999 or less.	1. Practice.	
2. Check subtraction by addition.	2. Practice.	
3. Work subtraction exercises involving 6 or less digits that necessitates regrouping across 0.	3. Place value chart; individualized contracts; Fundamental Drills and Tests; Time Machine; work sheets.	
4. Use subtraction to solve story problems.		
5. Use subtraction in multiple steps of story problems.		

Course or Grade Fifth

Concept: Multiplication

Objective: At the conclusion of this unit students will demonstrate a knowledge of multiplication. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Display immediate recall of basic multiplication facts with factors 12 or less.	1. Multiplication records and flash cards.	
2. Find the product of two numbers when one factor is 999 or less and the other factor is 999 or less.	2. Relays.	
3. Use multiplication to solve story problems.	3. Same as other story problems.	
4. Check multiplication by division.		

Course or Grade Fifth

Concept: Division

Objective: At the conclusion of this unit, the student will demonstrate a knowledge of division. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Divide a number 999 or less by a number 99 or less. 2. Check division exercises using multiplication and division. 3. Use division to solve story problems.		

Course or Grade Fifth

Concept: Fractions

Objective: At the conclusion of this unit, students will demonstrate a knowledge of fractions. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Write fractions for the lengths of shaded parts of unit objects.	1. Fraction parts with flannel board; colored ceramic tiles.	
2. Use multiplication to find fractions equivalent to given fractions.		
3. Identify the lowest terms fraction equivalent to a given fraction.	3. Pie shaped fraction wheel; sub-divided colored ceramic tiles.	
4. Find the lowest terms mixed numeral equivalent to a given fraction.		
5. Find sums and differences with fractions that have the same denominators.		
6. Find the sum of two fractional numbers represented by mixed numerals.	6. Rulers or number lines.	
7. Find the difference of two fractional numbers represented by mixed numerals.		
8. Find sums and differences with fractions that are mixed numerals.		

Course or Grade Fifth

Concept: Fractions

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
9. Use addition or subtraction of fractional numbers to solve stroy problems when problems are mixed.		
10. Find the product of two fractional numbers using fractions.		
11. Find the quotient of two fractional numbers using fractions.		

Course or Grade Fifth

Concept: Decimals

Objective: At the conclusion of this unit students will demonstrate a knowledge of decimals. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Regroup to express tenths as ones and tenths, or hundredths as tenths and hundredths, or thousandths as hundredths and thousandths.		
2. Compare two fractional numbers expressed as decimals.		
3. Add or subtract with decimals to hundred-thousandths when exercises are mixed.	3. Place value charts and money.	
4. Add and subtract decimals using dollar notations.	4. Stress place value.	
5. Use addition and subtraction to solve simple multiple-step story problems.		

Course or Grade Fifth

Concept: Geometry

Objective: At the conclusion of this unit students will demonstrate a knowledge of geometry. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify circles, rectangles, squares, and triangles.	1. Protractors, rulers, compasses.	
2. Identify pictures and symbols for points, line segments, lines, and rays.		

Course or Grade Fifth

Concept: Number Concepts

Objective: At the conclusion of this unit students will demonstrate a knowledge of number concepts. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify examples of the commutative property, the associative property, the property of zero, and the property of one for multiplication.	1. Continual stress throughout the year.	
2. Identify examples of the distributive property of multiplication over addition.		
3. Find the greatest common factor of two numbers.	3. Review since it was introduced before fractions.	
4. Find the least common multiple of two numbers.	4. Review since it was introduced before fractions.	
5. Distinguish between a prime and a composte number for numbers that are relatively small.		

Course or Grade: Fifth

Concept: Measurement

Objective: At the conclusion of this unit students will demonstrate a knowledge of measurement. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Measure and report lengths in inches, feet, yards, feet and inches, or yards and inches.	1. Trip to store to work with cost per lb. and ounces and grams. Practice with measuring devices (rulers, yard sticks, meter sticks, tapes, wheels).	
2. Measure and report lengths in whole numbers of centimeters, meters, or centimeters and meters.	2. Tapes, film and work sheets. Same as 1.	
3. Determine the appropriate unit (cm, m, km) in which to report lengths and report these to the nearest whole unit.	3. Meter tapes and kilogram scales.	
4. Determine the appropriate unit in ft., in., yd., and mile in which to report lengths and report these to the nearest whole unit.	4. Rounding off. Experience in measuring reading (specified things.)	

Course or Grade Sixth

Concept: Place Value

Objective: At the conclusion of this unit students will demonstrate a knowledge of place value. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Read a given numeral from 0-999,999,999,999 and a given fraction to the millionths.	1. Textbook, abacus, place value charts, number lines.	
2. Write the standard numerals for given powers of tens.	2. Textbook, powers of 10 chart.	
3. Round a given number to the nearest hundred billion or to the nearest hundred billionth.	3. Textbook, blackboard work, worksheet drill.	

Course or Grade Sixth

Concept: Addition

Objective: At the conclusion of this unit, students will demonstrate a knowledge of addition. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find the sum of two numbers each 999,999 or less.	1. Text, flash cards, records, reinforcement sheets, board work.	
2. Find the sum of three or more numbers each 999,999 or less.	2. Text, reinforcement sheets, board work.	
3. Find the sum when parentheses are used to indicate the order of operation.	3. Text, work sheets, review of addition properties.	
4. Use addition to solve story problems.	4. Text.	

Course or Grade Sixth

Concept: Subtraction

Objective: At the conclusion of this unit, students will demonstrate a knowledge of subtraction. ~~They will be able to:~~

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find the difference of two numbers each 999,999 or less.	1. Text, flash cards, records, reinforcement sheets, board work.	
2. Find the difference when parentheses are used to indicate the order of operation.	2. Text, work sheets, review of subtraction properties.	
3. Use subtraction to solve story problems.	3. Text.	

Course or Grade Sixth

Concept: Multiplication

Objective: At the conclusion of this unit, students will demonstrate a knowledge of multiplication. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find the product of two numbers when one factor is 999 or less and the other factor is 99,999 or less.	1. Text, reinforcement worksheet, records, board work.	
2. Use multiplication or other operations to solve story problems.	2. Text.	

Course or Grade Sixth

Concept: Division

Objective: At the conclusion on this unit, students will demonstrate a knowledge of division. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Divide a number 99,999 or less by a number 999 or less.	1. Text, reinforcement worksheet, boardwork, records.	
2. Use division or other operations to solve story problems.	2. Text.	

Course or Grade Sixth

Concept: Fractions

Objective: At the conclusion of this unit, students will demonstrate a knowledge of fractions. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find the greatest common factor of two numbers.	1. Text, factor trees, board work, reinforcement sheets.	
2. Find the least common multiple of two numbers.	2. Text, factor trees, board work, reinforcement sheets.	
3. Find the fraction with a specified denominator that is equivalent to a given fraction or mixed number.	3. Text, number lines, board work, reinforcement sheets.	
4. Reduce a given fraction or mixed numeral to lowest terms.	4. Text, board work, greatest common factor, reinforcement sheets.	
5. Find the sum of two fractional numbers or mixed numerals.	5. Text, board work, reinforcement sheets.	
6 Use addition with fractions or mixed numerals to solve story problems.	6. Text.	
7 Find the difference of two fractional numbers or mixed numerals.	7. Text, board work, reinforcement sheets.	
8. Use subtraction with fractions or mixed numerals to solve story problems.	8. Text.	

Course or Grade Sixth

Concept: Fractions

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
9. Find the product of two fractional numbers or mixed numerals.	9. Text, board work, reinforcement sheets, cross cancelation.	
10. Use multiplication with fractions or mixed numerals to solve story problems.	10. Text.	
11. Find the quotient of two fractional numbers or mixed numerals.	11. Text, board work, reinforcement sheets, reciprocals, cross cancelation.	
12. Use division with fractions or mixed numerals to solve story problems.	12. Text.	

Course or Grade Sixth

Concept: Decimals

Objective: At the conclusion of this unit, students will demonstrate a knowledge of decimals. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find the sum of two numbers using decimals to the hundred thousandths.	1. Text, place value charts, reinforcement sheets, board work, oral reading.	
2. Use addition of decimals to solve story problesm.	2. Text.	
3. Find the difference of two numbers using decimals to the hundred thousandths.	3. Text, place value charts, reinforcement sheets, board work, oral reading.	
4. Use subtraction of decimals to solve story problems.	4. Text.	
5. Find the product of two numbers using decimals to the hundred thousandths.	5. Text, reinforcement sheets, board work.	
6. Use multiplication of decimals to solve story problems.	6. Text.	
7. Find the quotient of two numbers using decimals to the hundred thousandths.	7. Text, rounding, reinforcement sheets, board work.	
8. Use division of decimals to solve simple story problems.	8. Text.	

Course or Grade Sixth

Concept: Ratio and Percent

Objective: At the conclusion of this unit, students will demonstrate a knowledge of ratio and percent. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Write a decimal for a ratio named by a certain percent.	1. Text, rounding, oral drill, reinforcement sheets.	
2. Write a percent for a ratio named by a given decimal or fraction.	2. Text, rounding, oral drill, reinforcement sheets.	

Course or Grade Sixth

Concept: Measurement and Geometry

Objective: At the conclusion of this unit, students will demonstrate a knowledge of measurement and geometry. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Measure and report lengths and distances using both the English System and the Metric System of measurement.	1. Text; films; metric system: meter, deci, centi, milli, deka, hecto, kilo; reinforcement sheets; board work.	
2. Measure and report various various weights using both the English System and the Metric System of measurement.	2. Text; films; metric system: gram, deci, centi, milli, deka, hecto, kilo.; reinforcement sheets; board work.	
3. Measure and report various volumes using both the English System and the Metric System of measurement.	3. Text; films; metric system: liter, deci, centi, milli, deka, heco, kilo.; reinforcement sheets; board work.	
4. Compute perimeter, area, and volume of given polygons using both the English System and the Metric System of measurement.	4. Text, board work.	
5. Use a protractor to measure angles.	5. Text.	
6. Identify right angles, acute angles, and obtuse angles.	6. Text.	
7. Identify radii, diameters, and chords of given circles.	7. Text.	

Course or Grade: Seventh Average and Low

Concept: Numbers and Numerals

Objective: At the conclusion of this unit, students will display a knowledge of numbers and numerals. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Write or identify numbers and numerals to 10,000,000.	File folder games, Math Bingo.	1. a. Write in words: 9,653,002. b. Write the numeral: two hundred forty thousand, seven hundred fifty-six.
2. Compare any 2 or more whole numbers.		2. a. Which is larger: 973 or 793? b. Write in order, beginning with the smallest: 1001, 989, 1010, 998.
3. Round whole numbers to any given place.	Card game "Slap".	3. Round 95,286 to the nearest: a. ten b. hundred c. ten thousand
4. Write compact numerals for expanded numerals, or vice versa.		4. a. Write the compact numeral for $(7 \times 10^3) + (8 \times 10^2) + (5 \times 10^1)$. b. Write in expanded form: 406,083.
5. Identify each place value, up to a billion, when given a number.		5. Tell the place value of the 7 in each numeral below: a. 987,503 b. 5,217 c. 763
6. Identify Roman numerals up to 2000, and write Roman numerals 1-100, and 100-1000.		6. a. Write the Roman numeral by 1's from 1-10 and by 10's from 10-100. b. Change the numbers below to Arabic numerals: MCMLXXX CDXC

Course or Grade: Seventh Average and Low

Concept: Numbers and Numerals

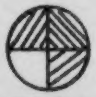
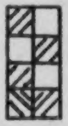
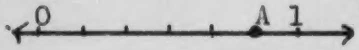
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
7. Write number sentences using > , < , or =.	Number sentence games from Number Sentences.	7. Insert the correct symbol (> , < , or =) to make each number sentence true: a. 93 + 5 ___ 101 - 4 b. 27 ___ 9 x 3 c. 4(8) + 3 ___ 4(9)

Course or Grade: Seventh Average and Low

Concept: Fractions

Objective: At the conclusion of the unit, students will display a knowledge of fractions. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Recognize fractions less than 1 using regions or a number line.	File folder games and puzzles Fraction pieces Fraction dominoes Math Bingo Fraction wheels Fraction poster	Written tests. 1. Tell what fraction is represented by: a. the shaded region  b. the shaded region  c. A 
2. Recognize the words numerator and denominator.		2. In the fraction $\frac{7}{8}$ the numerator is ____ and the denominator is ___.
3. Recognize a fraction as a form of division.		3. Write in simplest form: $\frac{63}{21}$.
4. Write equivalent fractions.	Card game "Crazy Fractions"	4. Using the given denominators, write fractions equivalent to $\frac{5}{6}$. $\frac{\quad}{18}$; $\frac{\quad}{42}$; $\frac{\quad}{30}$.
5. Compare and order fractions.	Card game "Fraction Logic"	5. Write in order, from smallest to largest: $\frac{7}{8}$, $\frac{2}{5}$, $\frac{1}{2}$, $\frac{15}{16}$.
6. Change mixed numerals to improper fractions.		6. Change $5\frac{2}{3}$ to an improper fraction.
7. Change improper fractions to mixed numerals.		7. Write $\frac{27}{4}$ as a mixed numeral.

Course or Grade: Seventh Average and Low

Concept: Fractions

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
8. Write a fractional number in simplest form.		8. Write $\frac{60}{72}$ in simplest form.
9. Find the reciprocal of a fractional number.		9. Find the reciprocals of: a. $\frac{3}{8}$ b. $\frac{12}{5}$

Course or Grade: Seventh Average and Low

Concept: Operations with Whole Numbers

Objective: ~~At the conclusion of th~~is unit, students will display a knowledge of addition, subtraction, multiplication, and division of whole numbers. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Recognize and use these properties: commutative, associative, distributive, properties of zero, properties of one.	Math Bingo File Folder games Competition at board	1. Find the value of n in each expression. a. $7 + n = 6 + 7$ b. $(4 \times 6) \times 8 = 4 \times (6 \times n)$ c. $9 \times (7 + 3) = (n \times 7) + (n \times 3)$ d. $39 + n = 39$ e. $42 \times n = 0$ f. $33 \times 1 = n$ g. $14 \div n = 1$
2. Add whole numbers of any size.	Dice game "Snake Eyes" "Shotzee" game "Heads Up" game "Krypto" and "Reckon" games "Little Professor"	2. $9683 + 471$
3. Subtract any whole number from a larger whole number and check	"Heads Up" "Krypto" "Reckon" "Little Professor"	3. Subtract and check: $4802 - 3979$
4. Multiply any whole numbers.	"Little Professor" electronic game	4. 269×35
5. Divide whole numbers, using a 1, 2 or 3 digit divisor. Check by multiplication.	"Krypto" "Reckon" "Little Professor"	5. Divide and check: $963 \div 27$
6. Estimate the sum, difference, product, or quotient.	"Slap" card game	6. Estimate: a. $49 + 62 \doteq$ ___ b. $526 - 234 \doteq$ ___ c. $32 \times 39 \doteq$ ___ d. $2561 \div 51 \doteq$ ___

Course or Grade: Seventh Average and Low

Concept: Decimal Numerals

Objective: At the conclusion of this unit, students will demonstrate a knowledge of decimals. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Recognize and write decimal numerals through the millionths place.	File Folder games "Math Bingo" Math competition at chalkboard	Written test. 1. a. Write as a decimal numeral: $\frac{37}{100}$; four and three tenths. b. Write .016 in words.
2. Write decimals as fractions.		2. Write as lowest term fractions: a. .025 b. .6
3. Order and compare 2 or more decimal numerals.		3. Write in order, from smallest to largest: .023, .009, .06, .1
4. Round decimal numerals to any given place, through millionths.		4. Round 12.3456 to the nearest: a. thousandth b. hundredth c. tenth
5. Write decimal numerals in expanded form, and write numbers in expanded form as compact decimal numerals.		5. a. Write 7.1608 in expanded form. b. Write $\frac{5}{10^1} + \frac{7}{10^3}$ as a decimal number in compact form.
6. Add decimal numerals.	Handy Math: Focus on Purchasing Sears Catalog "orders" Restaurant menu "orders"	6. 3.06 + 14.387 + .6
7. Subtract decimal numbers.		7. 93.27 - 47.196

Course or Grade: Seventh Average and Low

Concept: Decimal Numerals

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
8. Multiply decimal numerals.		8. 39.6 x .24
9. Divide decimal numerals.		9. a. $25\overline{)6.385}$ b. $.05\overline{)29.5}$
10. Write fractions as terminating or repeating decimals.	Look for patterns.	10. Write the decimal numbers equivalent to: a. $\frac{13}{16}$ b. $\frac{7}{11}$

Course or Grade: Seventh Average and Low

Concept: Percentage

Objective: At the conclusion of this unit, students will demonstrate a knowledge of percentages. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Write fractions as percents.	"Math Bingo" File folder games Newspapers for sales, taxes, etc.	1. Write as percents: 1/4, 3/8, 2/3.
2. Write whole or mixed numbers as percents.	Catalogs	2. Write as percents: 1, 2½.
3. Write decimal numerals as percents.	Fraction-Decimal "Old Maid" card game	3. Write as percents: .3, .26, .175
4. Change percents to the equivalent rational number.		4. Write the equivalent rational number: 120%, 66 2/3 %, 45%
5. Compare 2 or more numbers written in fraction, decimal, and/or percent form.	"Slap"	5. Circle the smallest number of each trio: a. 1/3, .3, 35% b. 1/20, .02, 20%
6. Find a given percent of a number.	Figure tax on menu and catalog orders.	6. What number is 45% of 800?
7. Find what percent one number is of another.		7. 25 is what percent of 125?
8. Find a number when a percent of it is known.		8. 17 is 25% of ___.

Course or Grade: Seventh Average and Low

Concept: Percentage

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
9. Use percentage to work everyday problems involving taxes, interest, discount, etc.	Sales circulars, menu orders; Survival Math Skills duplicating masters; Handy Math: Focus on Purchasing.	9. a. If the tax rate is 4%, how much tax would you pay on a purchase of $32.50? b. Sam borrowed $300 at an annual interest rate of 12%. What is the total amount he would repay after 1½ years? c. What is the sale price of a $65 coat bought at a 20% discount?

Course or Grade: Seventh Average and Low

Concept: Number Theory

Objective: At the conclusion of this unit, students will display a knowledge of number theory. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find the factors of any number less than 100.	Prime number chart Measuring tools: gallon, quart, and pint jars, cup, yardstick, ruler, and scale	1. List all factors of 36.
2. Distinguish between prime and composite numbers. Recognize prime numbers less than 100.	Game "Prime Drag"	2. By each of these numbers write "P" for prime and "C" for composite: 2 ____ 21 ____ 23 ____ 3 ____ 85 ____ 128 ____
3. Find the greatest common factor of a pair of numbers.	Charts that count by two's, five's, and ten's.	3. Find the greatest common factor of 36 and 90.
4. Find the least common multiple of a pair of numbers.	Card game "Follow the Leader"	4. Find the least common multiple of 12 and 18.
5. Write the prime factorization of any number less than 100.	Game "Prime Drag"	5. Write the prime factorization of: a. 36 b. 30 c. 64
6. Name and use divisibility tests for 2, 3, 4, 5, 6, 8, 9, and 10.		6. a. A number is divisible by 2 if ________________. A number is divisible by 3 if ________________. b. Which of the following numbers are divisors of 120? 2, 3, 4, 5, 6, 8, 9, 10

Course or Grade: Seventh Average and Low

Concept: Number Theory

Objective: ____________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
7. Use exponents and powers.		7. What number is represented by: a. 2^4 = ______ b. 5^3 = ______ c. 10^3 = ______ d. $3^2 \times 4^2$ = ______
8. Find and use the square of of number.		8. Find the squares of 17, 12, and 100.
9. Name the square root of a perfect square.		9. Find the square roots of 36, 676, and 100.
10. Add and subtract with measures.		10. a. 5 weeks 6 days + 4 weeks 5 days b. 6 gal. 2 qts. - 4 gal. 3 qts.
11. Identify odd and even numbers.		11. Write "E" for even and "O" for odd beside the following numbers: a. 178 b. 5161 c. 420
12. Identify number patterns.		12. Find the missing numbers in this series: a. 1, 4, 9, ____, ____, 36 b. 1, 3, 6, 10, ____, ____, 28

Course or Grade: Seventh Average and Low

Concept: Geometry and Measurement

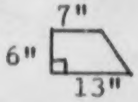
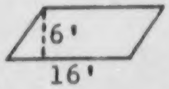
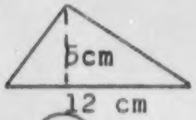
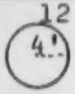
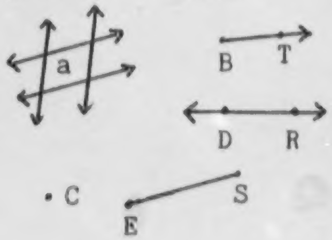
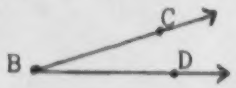
Objective: At the conclusion of this unit, students will display a knowledge of geometry and measurement. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Determine the length of a segment to the nearest inch, ½ inch, ¼ inch, centimeter, or millimeter.	Rulers, tape measures, geoblocks, graph paper, compasses, protractors	1. Measure given line segments to the nearest inch, ½ inch, ¼ inch, cm, and mm.
2. Measure distances using feet, yards, meters. Convert from one unit to another within a system.		2. a. Measure the room in feet and yards, and in meters. Also the length and width of the hall. b. 17 yards = ______feet 24 feet = ______yards 375 cm = ______m 2.63 m = ______mm
3. Identify polygons with 3, 4, 5, 6, 8, or 10 sides.	Collect magazine pictures of polygonal shapes	3. How many sides do each of the following polygons have: a. decagon ____ b. hexagon ____ c. triangle ____ d. pentagon ____ e. octagon ____ f. quadrilateral ____
4. Find the perimeter of any polygon.		4. Find the perimeter of a rectangle with length = 2.7 yds, width = 1.3 yds.
5. Find the circumference of a circle.	Measure actual circular objects to see relationships between circumference and diameter.	5. Find the circumference of a circle with a radius of 7 inches.

Course or Grade: Seventh Average and Low

Concept: Geometry and Measurement

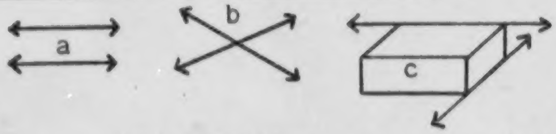
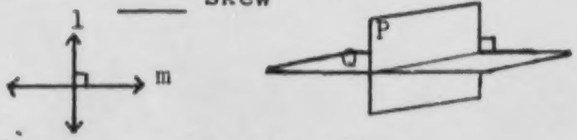
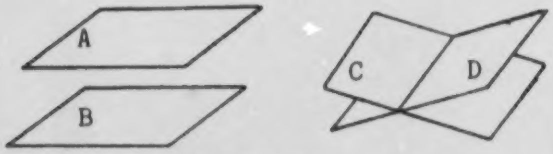
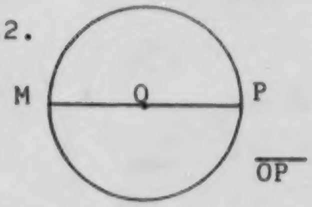
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
6. Find the area of triangles, parallelograms, trapezoids and circles.		6. a. Find the area of  b. Find the area of  c. Find the area of  d. Find the area of 
7. Interpret scale drawings and maps.	Use a state road map to figure distances to a given destination, plan a weekend trip, etc. Handy Math: Focus on Maps	7. On a map with scale $\frac{1}{4}$" = 10 miles, how far apart are two cities if they are 5" apart on the map.
8. Identify points, lines, planes, line segments, vertexes, and rays.		8. Match the following, giving the correct symbol for each drawing: _____ point _____ line _____ segment _____ plane _____ ray  In $\angle$ CBD, the vertex is _____. 

Course or Grade: Seventh Average and Low

Concept: Geometry and Measurement

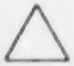
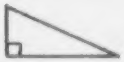
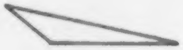
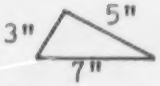
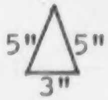
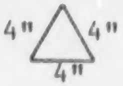
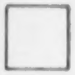
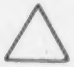
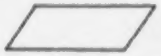
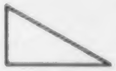
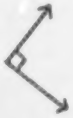
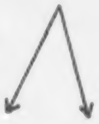
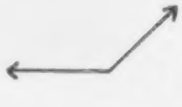
Objective: ____________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
9. Identify parallel, skew, or intersecting lines and segments.	Styrofoam & pipe cleaner models, drinking straws & modeling clay, cardboard boxes	9.  _______intersecting ____ parallel ____ skew
10. Identify perpendicular lines and planes.	Go outside and look for examples.	10.  Lines l and m, and planes P and Q, are said to be ____________ to each other.
11. Identify parallel or intersecting planes.		11.  Planes A and B are __________. Planes C and D are __________.
12. Identify a circle, radius, diameter, and circumference.		12.  In this circle, the diameter is ________. $\overline{OP}$ is a ________. The "perimeter" of a circle is called its ____________.

Course or Grade: Seventh Average and Low

Concept: Geometry and Measurement

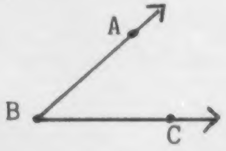
Objective: ______________________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
13. Identify triangles as right, acute, or obtuse; equilateral, isosceles, or scalene.	"Math Match" card game	13. a. Tell whether the triangle is right, acute, or obtuse:    __________ __________ __________ b. Tell whether the triangle is equilateral, isosceles, or scalene:    __________ __________ __________
14. Identify symmetric shapes. Draw their lines of symmetry.		14. If the figures below are symmetric, draw their lines of symmetry.    
15. Identify angles as acute, right, or obtuse.		15. Tell whether the following angles are acute, right, or obtuse:    __________ __________ __________

Course or Grade: Seventh Average and Low

Concept: Geometry and Measurement

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
16. Use a protractor to measure angles to the nearest degree.	Introduce using circular protractors.	16. Give the measure of angle ABC to the nearest degree. 

Course or Grade: Seventh Average and Low

Concept: Problem Solving

Objective: At the conclusion of this unit, students will display a knowledge of solving problems. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Solve verbal problems with addition, subtraction, multiplication, or division of whole numbers, including rates.	Problem - Solving Bingo Play money	1. a. Ann bought 3 sacks of candy with 24 pieces in each sack. She ate 8 pieces herself and split the rest with 3 other girls. How many pieces did each of the 4 girls get? b. How far does a car traveling 60 mph go in 2½ hours?
2. Solve verbal problems involving fractional numbers, ratios, and proportions.	Cross-Number Puzzle Kit (cards, workbooks, with verbal problems) _Handy Math_: _Focus on_ a. _Purchasing_ b. _Travel_ c. _Sports_ d. _Maps_	2. A recipe calls for 1/3 cup of sugar for 4 cups of juice. How much sugar is needed for 6 cups of juice?
3. Solve verbal problems involving decimal numbers, including money.		3. Beauregard had $50. If he spent $16.50 for slacks and $12.75 for a shirt, how much did he have left?

Course or Grade: Seventh Average and Low

Concept: Problem Solving

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Solve verbal problems involving percents, including discount, interest, taxes.	Survival Math Skills	4. a. Find the cost of a $40 pair of shoes, marked 25% off, if the tax rate was 5%. b. What is the interest for 6 months of a $250 loan, if the interest rate is 8%?

Course or Grade: Seventh High

Concept: Numbers and Sets

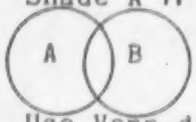
Objective: At the conclusion of this unit, students will demonstrate a knowledge of numbers and sets. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Distinguish between numerals and numbers		1. A (number, numeral) is the name of a (number, numeral).
2. Read and construct number lines, and be able to distinguish between graphs and coordinates	Giant number line Graph paper	2. On a number line, a point T is the graph of 7. Complete: "7 is the __________ of T."
3. Identify sets by roster and by rule, and use the symbols: $\{\ \}$, ϕ, $=$, $\in$, $\notin$		3. a. Identify by roster: $\{$one - digit primes$\}$ $\{$vowels$\}$ b. Identify by rule: $\{1, 4, 9, 16, 25, \ldots\}$ c. The empty set may be represented by the symbols _____ or _______. d. True or False: 1. $\{1, 3, 5\} = \{3, 5, 1\}$ 2. $3 \in \{$odd numbers$\}$ 3. $5 \notin \{$primes$\}$

Course or Grade: Seventh High

Concept: Numbers and Sets

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Identify equivalent sets		4. True or false: The following sets are equivalent. $\{7, 8, 0\}$ and $\{3 + 5, 0, 4 + 2\}$
5. Understand and use the symbols: $>, <, \subset, \not\subset, \cap, \cup$		5. True or false: a. $7 X 3 > 5 X 4$ b. $1683 < 40 X 42$ c. $\phi \subset \{1, 2, 3\}$ d. $\{a\} \not\subset \{consonants\}$
6. Find intersections and unions of sets.	Attribute "blocks" -- transparent for use on overhead projector	6. a. $\{6, 2, 1, 4\} \cap \{0, 3, 6 \ldots\} =$ ____ b. $\{0, 2, 4 \ldots\} \cup \{1, 3, 5\} =$ ____
7. Use Venn diagrams to picture sets and subsets.		7. a. Shade $A \cap B$  b. Use Venn diagrams to show $A \subset B$

Course or Grade: Seventh High

Concept: Operations and Properties of Arithmetic

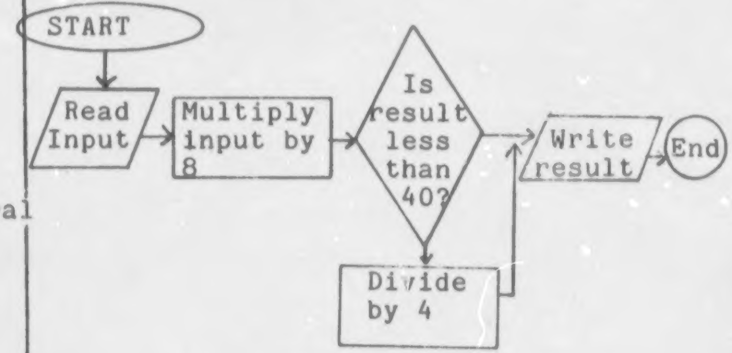
Objective: At the conclusion of this unit, students will display a knowledge of the operations and properties of arithmetic. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Add, subtract, multiply, and divide whole numbers.	Folder games Math bingo Heads up Shotzee Snake eyes Krypto Reckon Math match	1. a. 2064 + 358 b. 9000 - 784 c. 19,683 x 24 d. 975 ÷ 29
2. Identify functions, and state the domain and range.		2. a. Is $f(n) = n + 3$ a function? b. State the range if the domain is $\{27, 13, 42\}$
3. Use variables and find the solutions of simple open sentences.		3. Solve for n: a. $n + 17 = 29$ b. $32 - n = 18$ c. $5n + 1 = 26$ d. $\frac{27}{n} = 9$

Course or Grade: Seventh High

Concept: Operations and Properties of Arithmetic

Objective: ______

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Apply the basic properties of addition and multiplication: commutative associative distributive identity elements multiplication by zero		4. Find the value of n that will make each of the following equations true: a. 5 + n = 7 + 5 b. 6 x 19 = 19 x n c. 4 + (7 + 3) = (n + 7) + 3 d. (27 x n) x 18 = 27 x (13 x 18) e. 43 (n + 16)= (43 x 5) + (43 x 16) f. 47 + n = 47 g. 39 x n = 39 h. 39 x n = 0
5. Write expanded notation for place value numerals.		5. Write 5,280 in expanded notation.
6. Make and use flow charts		6. a. Make a flow chart showing how to round a number to the nearest tenth. b. Input = 4, Output = ______  START Read Input Multiply input by 8 Is result less than 40? Write result End Divide by 4
7. Read and write Roman numerals.	Complete: Arabic Numeral Roman Numeral 27 ______ 544 ______ ____ XCVII ____ MCMLXXX	

Course or Grade: Seventh High

Concept: Number Theory

Objective: At the conclusion of this unit, students will display a knowledge of number theory. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find all the factors of any number less than 100.	Prime number chart File folder games Prime drag	1. List all the factors of (a) 35 and (b) 72.
2. Write the prime factorization of any number less than 200.	Repeated division Factor trees	2. a. Use repeated division to find the prime factorization of 120. b. Construct a factor tree to find the prime factorization of 144.
3. Find the greatest common factor of a pair of numbers.	Spelling bee-type contest, naming GCF	3. GCF (12,18) = ________ GCF (20,50) = ________ GCF (25,36) = ________

Course or Grade: Seventh High

Concept: Number Theory

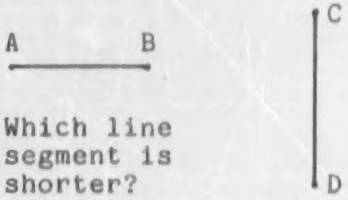
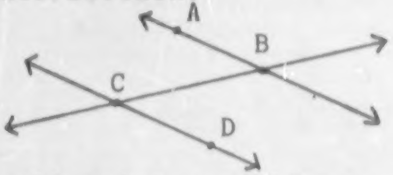
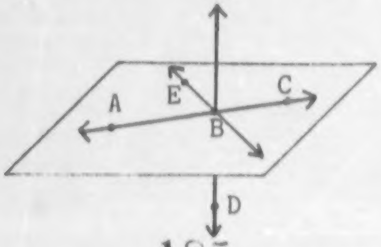
Objective: ____

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Find the least common multiple of a pair of numbers.	Follow the leader card game	4. LCM (12,15) = ____ LCM (12,7) = ____ LCM (20,30) = ____
5. Name and use divisibility tests for 2, 3, 4, 5, 6, 8, 9, and 10		5. a. Complete: A number is divisible by 2 if ____ 3 if ____ 4 if ____ 5 if ____ b. By which of the numbers 2, 3, 4, 5, 6, 8, 9, 10 is 1200 divisible?
6. Recognize prime numbers less than 100.	Construct Sieve of Eratosthenes for numbers up to 100	6. Tell whether each of the following numbers is prime (P), composite (C), or neither (N). 1 ____ 15 ____ 99 ____ 2 ____ 18 ____ 5 ____ 21 ____ 6 ____ 0 ____

Course or Grade: Seventh High

Concept: Geometry and Measurement

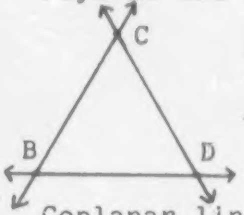
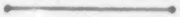
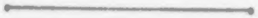
Objective: At the conclusion of this unit, students will display a knowledge of geometry and measurement. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify line segments.		1.  Which line segment is shorter?
2. Construct a line segment congruent to a given line segment.	Rulers, compasses	2. Construct a line segment congruent to EF
3. Identify lines and points on the line.		3. Name two pairs of intersecting lines and their points of intersection: 
4. Identify planes, and points and lines on the planes.	Cardboard, wire, etc. models made by students.	4. Name all points and lines shown on Plane P. 

Course or Grade: Seventh High

Concept: Geometry and Measurement

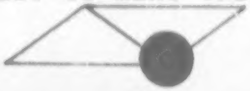
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
5. Tell what is meant by half-lines and half-planes.		5. Complete: A ________ is a subset of a line consisting of all the points on one side of a given point on the line. A half-plane is a subset of a ________ consisting of all points on one side of a given ________ in the plane.
6. Name rays and angles.	Student-made models of styrofoam, pencils, wire, or cardboard.	6. Name the angle formed by rays BC and BD. ________  Angle CDB is the union of rays _____ and _____.
7. Identify lines that are parallel, intersecting, and skew.	Student-made models of styrofoam, pencils, wire, or cardboard.	7. Coplanar lines that do not intersect are ________. Two lines with one point in common are said to ________. Non-coplanar lines are ________ lines.
8. Use both the U.S. and the metric system of measurements.	Rulers, meter sticks.	8. Measure the following line segments to the nearest mm, cm, and $\frac{1}{8}$".  

Course or Grade: Seventh High

Concept: Geometry and Measurement

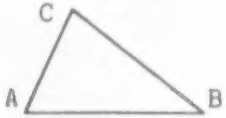
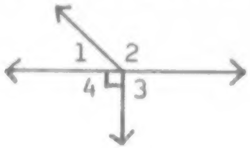
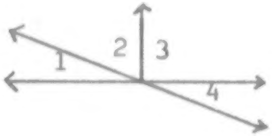
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
9. Convert U.S. measurements to other U.S. measurements, and metric measurements to other metric measures.		9. a. 25ft. = ______yd. b. 35gal.= ______qts. c. 5.34km = ______m d. 4683g = ______kg
10. Identify polygons with 3, 4, 5, 6, 8, or 10 sides.	Georule, polygon pieces, Tangrams, posters, student-made bulletin boards.	10. How many sides does each of the following polygons have? _____ triangle _____ hexagon _____ decagon _____ pentagon _____ quadrilateral _____ octagon
11. Find perimeters of polygons.	Cardboard and styrofoam polygons, tape measures.	11. Find the perimeters of the following equilateral polygons: a. pentagon, s = 5" b. hexagon, s = $\frac{2}{3}$yd. c. triangle, s = 2.3cm
12. Find areas of rectangles, parallelograms, triangles, and trapezoids.	Cardboard model of: a. parallelogram with "flaps" to change it to a rectangle; b. parallelograms cut in half to make triangles. 	12. a. Find the area of each of the following: 1. rectangle, l = 13', w = 7' 2. parallelogram, b = 20m, h=8m 3. triangle, b = 45cm, h = 30cm 4. trapezoid, b_1= 12", b_2 = 18", h = 5" b. Draw a 120° angle.

Course or Grade: Seventh High

Concept: Geometry and Measurement

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
12. Continued		12. c. Measure each angle of Δ ABC. 
13. Identify acute angles, right angles, and obtuse angles.		13. Identify the numbered angles as acute, right, or obtuse. 
14. Identify supplementary angles, complementary angles, and vertical angles.		14. a. In the figure above, name a pair of supplementary angles. b.  In the figure above, name a paire of complementary angles and a pair of vertical angles.

Course or Grade: Seventh High

Concept: Geometry and Measurement

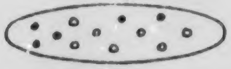
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
15. Find the circumference and area of a circle.	Develop idea of the value of π by measuring and finding ratio of c to d in actual circular.	15. Find the circumference and area of a circle with a radius of 14'. (Use 22/7 for π .)
16. Find the surface area and volume of a rectangular prism.	Geometric solid sets	16. Find the total surface area and volume of a rectangular prism with l = 12 ft., w = 8 ft., h = 10 ft.

Course or Grade: Seventh High

Concept: Rational Numbers

Objective: At the conclusion of this unit, students will display a knowledge of rational numbers. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use a rational number to describe part of a set.	Colored transparent discs to use on overhead	1. What fraction of the set of dots is dark? 
2. Write equivalent fractions for a rational number.	Fraction wheels Fraction posters Crazy Fractions card game Equal pairs card game	2. Find the value of n that will make each statement true: $5 = \frac{10}{n}$ $\frac{n}{2} = 6$ $\frac{3}{8} = \frac{n}{24}$ $\frac{5}{7} = \frac{20}{n}$
3. Reduce a fraction to lowest terms.	File folder games	3. Write in simplest form: $\frac{6}{20}$ $\frac{13}{39}$ $\frac{24}{30}$

Course or Grade: Seventh High

Concept: Rational numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Find equivalent fractions for mixed numerals.		4. Write as improper fractions: $3\frac{2}{3}$, $15\frac{3}{4}$
5. Find equivalent mixed numerals for improper fractions.		5. Write as mixed numerals: $\frac{29}{3}$ and $\frac{47}{8}$
6. Determine which of two fractions is greater.	Fraction logic card game	6. Circle the larger fraction of each pair: $\frac{3}{4}$ & $\frac{1}{3}$ $\frac{2}{5}$ & $\frac{2}{7}$ $\frac{1}{5}$ & $\frac{1}{6}$ $\frac{3}{7}$ & $\frac{5}{9}$

Course or Grade: Seventh High

Concept: Rational numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
7. Add, subtract, multiply, and divide rational numbers.	Math bingo Fraction Old Maid (card game) Fwhop? (card game) Crazy Fractions (card game)	7. Give the sum, difference, product, & quotient for each pair of fractions: a. $\frac{3}{8}$ and $\frac{1}{4}$ b. $\frac{25}{7}$ and $\frac{2}{3}$ c. $\frac{9}{10}$ and $\frac{2}{5}$
8. Use ratios and proportions to solve problems.		8. If it takes 2 lbs. of meat to make chili for 9 people, how many lbs. will be needed to serve 12 people?
9. Apply the definition of percent in simple cases.	Newspaper ads	9. What percent of 32 is 4? 36 is what percent of 45?

Course or Grade: Seventh High

Concept: Decimals

Objective: At the conclusion of this unit, students will display a knowledge of decimals. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Write any rational number in decimal notation.	Math Bingo Concentration (matching fraction & decimal)	1. Write as a decimal number: $\frac{7}{100}$, $5\frac{3}{10}$, $\frac{3}{4}$, $\frac{5}{7}$
2. Read and understand a decimal numeral.		2. a. Write in words: 3.027 b. Write the decimal numeral: two hundred and twelve thousandths
3. Add, subtract, multiply, and divide decimal numbers.	Math Bingo Adventures with Arithmetic: Decimals (worksheets) Electric Drill: Decimals	3. a. 2.46 + .038 + 123.4 b. 35.6 - 2.78 c. 29.7 x .16 d. 463.3 ÷ .25
4. Find the fraction equivalent of any terminating decimal.		4. Write as a fraction in lowest terms: .125 .6 .75

Course or Grade: Seventh High

Concept: Decimals

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
5. Find a decimal equivalent of any common fraction.	Beefing Up Basic Skills: Decimals Mathimagination: Decimals	5. Write as a decimal: $\frac{5}{8}$, $\frac{2}{3}$, $\frac{27}{1000}$, $\frac{5}{16}$
6. Determine which of two decimal numerals is larger.		6. Circle the larger number of each pair: .3 and .29 .002 and .02
7. Round a decimal numeral to a given place.		7. Round 3.14159 to the nearest: a. hundredth b. ten thousandth c. thousandth

Course or Grade: Seventh High

Concept: Percentage

Objective: At the conclusion of this unit, students will display a knowledge of percentage. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Express a fraction or a decimal as a percent.	File folder games	1. Change to a percent: $\frac{3}{8}$; $\frac{1}{4}$; $\frac{4}{5}$; .27; .6
2. Express a percent as a fraction or a decimal.		2. Complete: Percent · Fraction · Decimal 20% ______ ______ 150% ______ ______ 35% ______ ______
3. Find a percent of a given amount.	Catalog orders Newspaper sale ads Tax on menu orders	3. Find: 8% of \$165 = ______________ 20% of 5.25 = ______________

Course or Grade: Seventh High

Concept: Percentage

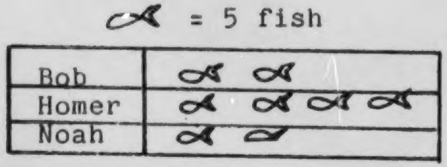
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Find what percent one number is of another.		4. 25 is what % of 75? 32 is what % of 64? 32 is what % of 48?
5. Find an amount when a percentage of it is given.		5. 30 is 10% of ____________. 45 is 20% of __________.
6. Use percents in everyday problems.	(ditto sources) Survival Math Skills Electric Drill: Percent Adventures with Arithmetic: Percent Handy Math: Focus on 1. Purchasing 2. Travel 3. Sports	6. Cost of meal $12.00 - leave 15% tip and pay 4% tax. What is the total cost? In a solution that is 30% alcohol, how much alcohol is in 15 quarts of the solution?

Course or Grade: Seventh High

Concept: Statistics

Objective: At the conclusion of this unit, students will display a knowledge of graphs and averages. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Read and construct bar graphs, pictographs, and broken-line graphs.	Transparencies from book How to Lie with Statistics Graph paper Coordinate grid chalk board	1. a. Construct a bar graph to show the miles per gallon of 4 cars: (Lynx, 15), (Cheetah, 17), (Sphinx, 16) and (Panther, 19). b. How many fish did Homer catch? Fish caught 
2. Find the average of a list of numbers (mean).		2. Find Albert's average, to the nearest whole number, if his scores are 76, 83, 92, 88, 86, and 86.
3. Find the median of a list of numbers.		3. What is his median score?
4. Find the mode of a distribution.		4. What is the mode?

Course or Grade: Seventh High

Concept: Positive and negative numbers

Objective: At the conclusion of this unit, students will display a knowledge of positive and negative numbers. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Add, subtract, multiply, and divide integers.	Large number line	1. $^{+}27 + {}^{-}13 =$ __________ $^{-}42 - {}^{-}45 =$ __________ $^{-}24 \text{ x } {}^{-}3 =$ __________ $^{-}42 \div {}^{+}6 =$ __________
2. Graph ordered pairs of integers in a plane.	Coordinate grid chalk board Picture Graphing Graphiti	2. Locate the following points on a graph: a. (6,3) c. (4, -2) b. (-2,5) d. (-3,-1)

Course or Grade: Eighth Average and Low

Concept: Operations with Whole Numbers

Objective: At the conclusion of this unit, students will demonstrate a knowledge of operations with whole numbers. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Express number phrases in the simplest numerical form.	Lecture and illustration Chalkboard Directed student activity	1. Give the simplest numerical answer for the number phrase: a. 7 + 8 = _______ b. 12 X 9 = ______ c. (21 - 7) + (14 - 2) = _____
2. Express word phrases in the simplest numerical form.	Lecture and illustration Chalkboard Directed student activity	2. Give the simplest numerical answer for the word phrase. a. Seven minus four = ______ b. The product of three and nine = _______ c. The sum of seven and eight = _______
3. Write compact numerals for expanded numerals.	Lecture and illustration Chalkboard Directed student activity	3. Give the compact numeral for: a. 6000 + 200 + 70 + 6 = _____ b. 30,000 + 600 + 4 = _____

Course or Grade: Eighth Average and Low

Concept: Operations with Whole Numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Write expanded numerals for compact numerals.	Lecture and illustration Chalkboard Directed activity	4. Write in expanded form: a. 3476 = b. 72,956 = c. 476,284 =
5. Write the compact numeral for the word name of a number.	Teacher made work-sheets	5. Give the compact numeral for: a. Four hundred sixty-two thousand b. Eighteen thousand, forty
6. Give the word name for a compact numeral.	Teacher made work-sheets	6. Write out, in words, the way you would "read" this number: a. 42,708 b. 105,725 c.8, 900,009

Course or Grade: Eighth Average and Low

Concept: Operations with Whole Numbers

Objective: ____________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
7. Recognize the language of addition and subtraction.	Lecture and illustration Chalkboard Directed activity	7. Match the following: a.____ Addition is the naming of a sum; subtraction, the naming of an ________. b.____ The way we ________ the addenus does not affect the sum. c.____ The sum of ________ and any number is the number. d.____ Subtracting a number ________ adding the number. 1. order 2. undoes 3. addend 4. group
8. Recall basic addition facts.	Lecture and illustration Chalkboard Directed activity	8. Name the sum: a. 9+ 4 + 6 + 8 + 6 = ________ b. 89 +77 c. 672,698 + 319,461

Course or Grade: Eighth Average and Low

Concept: Operations with Whole Numbers

Objective: ____________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
9. Recall basic subtraction facts	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	9. Find the difference: a. 71 - 6 - 8 - 3 - 9 = ________ b. 723 - 514 c. 70,036 - 17,288
10. Round whole numbers to the nearest multiple of 10.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	10. Round these numbers to the nearest 10. a. 47 ≈ ________ b. 4823 ≈ ________ c. 7296 ≈ ________
11. Round whole numbers to the nearest nultiple of 100.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	11. Round these numbers to the nearest 100. a. 836 ≈ ________ b. 7960 ≈ ________ c. 10,065 ≈ ________

Course or Grade: Eighth Average and Low

Concept: Operations with Whole Numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
12. Round whole numbers to the nearest multiple of 1000.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	12. Round these numbers to the nearest 1000. a. 2459 ≈ ______ b. 8541 ≈ ______ c. 30,698 ≈ ______
13. Estimate the sum of two numbers, using the rounding process.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	13. a. Round the addends to the nearest ten to estimate the sum. 47 ≈ 52 ≈ + 68 ≈ b. Round the addends to the nearest hundred to estimate the sum. 625 ≈ 371 ≈ + 485 ≈ c. Round the addends to the nearest thousand to estimate the sum. 2985 ≈ + 3178 ≈

Course or Grade: Eighth Average and Low

Concept: Operations with Whole Numbers

Objective: ______________________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
14. Estimate the difference of two numbers, using the rounding process	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	14. a. Round both numbers to the nearest ten to estimate the difference. 43 ≈ - 28 ≈ b. Round both numbers to the nearest 100 to estimate the difference. 927 ≈ - 318 ≈ c. Round both numbers to the nearest 1000 to estimate the difference. 36,245 ≈ - 17,928 ≈
15. Recognize the language of multiplication and division.	Lecture and illustration Chalkboard Directed activity	15. Match the following: a.____Division is the naming of a ________or quotient. b.____The product of ________ and any number is zero. c.____The product of _____ and any number is the number. d.____Dividing by a number ______multiplying by the number. 1. undoes 2. zero 3. one 4. factor

Course or Grade: Eighth Average and Low

Concept: Operations with Whole Numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
16. Recall basic multiplication facts.	Lecture and Illustration Chalkboard Directed activity	16. Find the product: a. $\begin{array}{r}73\\ \times\ 7\\ \hline\end{array}$ b. $\begin{array}{r}7429\\ \times\ 334\\ \hline\end{array}$
17. Recall basic division facts	Lecture and Illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	17. Name the quotient and remainder. a. $52\overline{)614}$ b. $283\overline{)46{,}328}$
18. Solve verbal problems involving rates.	Lecture and Illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	18. Bus tickets for the field trip cost \$9 each. This is at the rate of \$9 per ticket. Use the equation $9 \times t = d$ to find the cost of: a. 12 tickets b. 72 tickets

Course or Grade: Eighth Average and Low

Concept: Operations with Whole Numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
19. Recognize the language used with equations and inequalities.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	19. Match the following: a. ____ $6 + 7 = 13$ b. ____ $6 + 7 > 12$ c. ____ $6 + a = 10$ (name other than equation) d. ____ A number we name to solve an open number sentence is called a ______________. e. ____ If there is no number that is a solution, we say the solution is the ____________. 1. inequality 2. open number sentence 3. empty set 4. equation 5. solution

Course or Grade: Eighth Average and Low

Concept: Operations with Whole Numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
20. Solve a number sentence using a given set.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	20. Choose from { whole numbers } to solve the following number sentences: a. $17 + 9 = a$ b. $x - 6 = 17$ c. $3 + a < 7$ d. $7 < x < 12$
21. Solve verbal problems involving operations with whole numbers, including money.	Lecture and illustration Chalkboard Directed activity	21. Solve the following word problems. a. Bill Evans buys 2 loaves of bread at 59¢ each and 2 packages of cereal at 95¢ each. How much does he spend in all? b. How much less does Jen pay for 4 cans of soup at 29¢ than for 5 cans at 27¢ each.

Course or Grade: Eighth Average and Low

Concept: Operations with Whole Numbers

Objective: ______________________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
22. Name missing terms in a sequence.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	22. Give the next 5 terms in the following sequences. a. 1, 5, 9, 13, ... b. 1, 3, 6, 10, ... c. 1, 4, 9, 16, ...
23. Write number pairs using equations and f(x) notation	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	23. Use the rule the complete the ordered pairs. a. n - 7 = f(n): {(11, __), (23, __), (31, __)} b. (6 x n) + 5 = f (n): {(4, __) (6, __), (8, __)}

Course or Grade: Eighth Average and Low

Concept: Fractions, Decimals, Percents

Objective: At the conclusion of this unit, students will demonstrate a knowledge of fractions, decimals, and percents. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Recognize a fraction as a form of division.	Lecture and illustration Chalkboard Directed activity Teacher-made worksheet	1. Write 2 other forms for the division. a. $\frac{28}{7}$ b. $\frac{5}{6}$ c. $3 \div 5$ d. $8\overline{)7}$
2. Multiply a whole number by a fractional number.	Lecture and illustration Chalkboard Directed activity	2. State your final answer in simplest form. a. $\frac{1}{4} \times 17$ b. $\frac{1}{8}$ of 63
3. Give many names for any fractional number.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	3. Give three fractions equivalent to each of the following: a. $\frac{2}{3}$ b. 1 c. $\frac{4}{5}$

Course or Grade: Eighth Grade Average and Low

Concept: Fractions, Decimals, Percents

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Use exponents, powers.	Lecture and illustration Chalkboard Directed activity Duplicating masters	4. Give the final result: a. 4^3 b. 10^4 c. the cube of 5 d. the fifth power of 2. e. $2^3 + 2^2 + 2 + 1$ Solve for the missing number: a. $b^3 = 125$ b. $d^4 = 625$ c. $7^h = 2401$ d. $8^k = 512$
5. Write compact numerals for expanded numerals.	Lecture and illustration Chalkboard Directed activity Duplicating masters	5. Write the compact numberal: a. $(2 \times 10^2) + (3 \times 10) + 8$ b. $(5 \times 10^4) + (2 \times 10^2) + 8$ c. $7000 + 800 + 4$

Course or Grade: Eighth Average and Low

Concept: Fractions, Decimals, Percents

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
6. Write expanded numerals for compact numerals.	Lecture and illustration Chalkboard Directed Activity	6. Use exponents and powers of ten to name the number. a. seven thousand two hundred seventy-six b. 7000 + 900 + 80 + 7 c. 27,684
7. Recall the place values from ten thousands to ten-thousandths for decimal numerals.	Lecture and illustration Chalkboard Directed Activity Houghton Miffin duplicating masters	7. Indicate the place value of each digit in this numeral 98,765.0012
8. Write a fraction, with a denominator of 10, 100, 1000, or 10,000 as a decimal numeral.	Lecture and illustration Chalkboard Directed Activity Houghton Miffin duplicating masters	8. Write the fraction as a decimal. a. $\frac{4}{10}$ b. $\frac{3}{100}$ c. $\frac{27}{1000}$

Course or Grade: Eighth Average and Low

Concept: Fractions, Decimals, Percents

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
9. Write decimal numerals in fraction form, with a denominator of 10,100, 1000,10,000.	Lecture and illustration Chalkboard Directed activity Houghton Miffin duplicating masters	9. Write the decimal as a fraction. a. .7 b. .002 c. .724
10. Given the expanded form, with exponents, write the compact numeral.	Lecture and illustration Chalkboard Directed activity Houghton Miffin duplicating masters	10. Give the compact numeral. a. $(5 \times 10) + (7 \times 1) + (2 \times \frac{1}{10}1)$ b. $(3 \times 10^2) + (8 \times 10) + (2 \times \frac{1}{10}1) +$ $(4 \times \frac{1}{10^2})$
11. Given the compact numeral, use exponents to write the expanded form.	Lecture and illustration Chalkboard Directed activity Houghton Miffin duplicating masters	11. Use exponents to write the expanded numeral. a. 3.416 b. 24.18 c. .079

Course or Grade: Eighth Average and Low

Concept: Fractions, Decimals, Percents

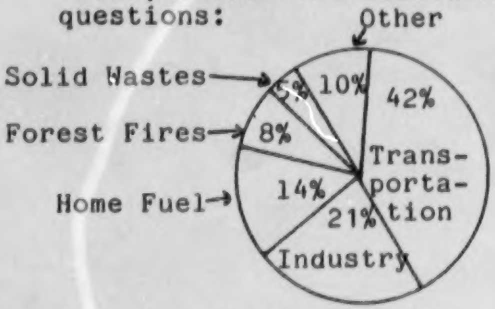
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
12. Write fractions as percents.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	12. Give the percent for each fraction a. $\frac{7}{100}$ b. $\frac{127}{100}$ c. $\frac{3}{20}$ d. $\frac{5}{12}$
13. Write decimals as percents.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	13. Give the percent for each decimal. a. .26 b. .785
14. Write percents as fractions (in lowest terms).	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	14. Give the fraction (in lowest terms) that is equivalant to the given percent. a. 37% b. 60%

Course or Grade: Eighth Average and Low

Concept: Fractions, Decimals, Percents

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
15. Write percents for decimal numerals.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	15. Write the decimal as a percent a. .83 b. .5 c. .735
16. Find a given percent of a whole number.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	16. Find the number each of the following would be equal to: a. 33% of 300 b. 87% of 1000 c. 100% of 275
17. Interpret circle graphs.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	17. From the circle graph shown, answer the following questions:  Sources of Air Pollution

Course or Grade: Eighth Average and Low

Concept: Fractions, Decimals, Percents

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
17. cont.		17. cont. a. The total circle graph for any purpose has to total _______%. b. What is the largest source of air pollution?
18. Change an improper fraction to a mixed numeral in lowest terms.	Lecture and illustration Chalkboard Directed activity	18. Give the fraction as a mixed numeral in lowest terms. a. $\frac{44}{5}$ b. $\frac{78}{9}$
19. Change a mixed numeral to an improper fraction.	Lecture and illustration Chalkboard Directed activity	19. Write the mixed numeral as an improper fraction. a. $2\frac{3}{8}$ b. $21\frac{2}{3}$

Course or Grade: Eighth Average and Low

Concept: Fractions, Decimals, Percents

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
20. Write any given number of percent as a mixed numeral in simplest form.	Lecture and illustration Chalkboard Directed activity	20. Change the percent to a mixed numeral in simplest form. a. 350% b. 220%
21. Write any given decimal numeral as a mixed numeral in simplest form.	Lecture and illustration Chalkboard Directed activity	21. Change the decimal number to a mixed numeral in simplest form. a. 2.25 b. 7.15
22. Use division to change fractions to decimal numerals.	Lecture and illustration Chalkboard Directed activity	22. Find the decimal equivalent for the following fractions. a. $\frac{5}{8}$ b. $\frac{3}{32}$ c. $\frac{43}{80}$

Course or Grade: Eighth Average and Low

Concept: Fractions, Decimals, Percents

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
23. Use division to change mixed numerals to decimal numerals.	Lecture and illustration Chalkboard Directed activity	23. Find the decimal equivalent for the following mixed numerals. a. $5\frac{13}{20}$ b. $2\frac{17}{25}$
24. Round decimal numerals to the nearest tenth.	Lecture and illustration Chalkboard Directed activity	24. Round the following to the nearest tenth. a. .2572 b. 6.0656 c. 40.0008
25. Round decimal numerals to the nearest hundredth.	Lecture and illustration Chalkboard Directed activity	25. Round the following to the nearest hundredth. a. .6636 b. .76666 c. 27.0067

Course or Grade: Eighth Average and Low

Concept: Fractions, Decimals, Percents

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
26. Round decimal numerals to the nearest thousandth.	Lecture and illustration Chalkboard Directed activity	26. Round the following to the nearest thousandth. a. .52525 b. 12.5036 c. 4.1526
27. Use division to change from a fraction to a repeating decimal numeral.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	27. Find the decimal equivalent for the following fractions. Indicate which digit (s) repeat. a. $\frac{2}{3}$ b. $\frac{5}{6}$ c. $\frac{11}{13}$

Course or Grade: Eighth Average and Low

Concept: Operations with Fractional Numbers

Objective: At the conclusion of this unit, students will demonstrate a knowledge of operations with fractional numbers. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Compare and distinguish relationship between any 2 numbers.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	1. Write <, =, or > to complete the number sentence. a. $\frac{1}{2}$ $\frac{1}{3}$ b. $\frac{2}{3}$ 75% c. $\frac{1}{3}$ .35 d. $66\frac{2}{3}\%$ $\frac{2}{3}$
2. Determine if a zero is significant or not for any given number.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	2. Write yes or no to show whether the zero is significant or not. a. 270 b. 207 c. .207 d. 2.70 e. .270

Course or Grade: Eighth Average and Low

Concept: Operations with Fractional Numbers

Objective: ____________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
3. Add fractional numbers with sums to 1 with like and unlike denominators.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	3. Name the sum in simplest form. a. $\frac{2}{3} + \frac{1}{6}$ b. $\frac{1}{6} + \frac{3}{4}$
4. Subtract fractional numbers with differences less than 1 with like and unlike denominators.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	4. Name the difference in simplest form. a. $\frac{7}{8} - \frac{4}{8}$ b. $\frac{5}{7} - \frac{3}{14}$
5. Add mixed numerals with like and unlike denominators.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	5. Give the sum in its simplest form. a. $2\frac{5}{7} + 3\frac{4}{7}$ b. $6\frac{7}{8} + 4\frac{5}{6}$ c. $\begin{array}{r} 6\frac{1}{12} \\ +5\frac{7}{24} \\ \hline \end{array}$

Course or Grade: Eighth Average and Low

Concept: Operations with Fractional Numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
6. Subtract mixed numerals with like and unlike denominators.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	6. Give the difference in its simplest form. a. $7\frac{5}{7} - 3\frac{2}{7}$ b. $\begin{array}{r} 6\frac{2}{3} \\ -4\frac{5}{6} \\ \hline \end{array}$ c. $\begin{array}{r} 7\frac{2}{9} \\ -3\frac{5}{18} \\ \hline \end{array}$
7. Add with decimal numerals.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	7. Find the sum for the following. a. $\begin{array}{r} 6.25 \\ +\ 4.96 \\ \hline \end{array}$ b. 36 + 48.76 c. 52 + .009

Course or Grade: Eighth Average and Low

Concept: Operations with Fractional Numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
8. Subtract with decimal numerals.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	8. Find the difference for the following. a. $\begin{array}{r} 8.30 \\ \underline{-3.76} \end{array}$ b. 14.9 - 2.78 c. 32 - .985
9. Solve verbal problems requiring addition with fractional numbers, decimal numerals, and mixed numerals.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	9. Solve the following word problems: a. Jack worked on the paper drive committee. On Wednesday he worked $1\frac{3}{4}$ hours, on Thursday $2\frac{1}{2}$ hours, and on Friday $3\frac{1}{4}$ hours. How many hours did he work in all? b. During the "Trash for Cash" drive, 42.46 pounds of bottles were collected in the morning, 67.32 pounds in the afternoon, and 59.25 pounds in the evening. How many pounds of bottles were collected in all?

Course or Grade: Eighth Average and Low

Concept: Operations with Fractional Numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
10. Solve verbal problems requiring subtraction with fractional numbers, decimal numerals, and mixed numerals.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	10. Solve the following word problems. a. When the Ecology Club began their "River Bank Project", the temperature was 56.2°F. At lunchtime, it was 75.7°F. How much did the temperature rise? b. A paper drive lasted 4 days. 16% of the papers were collected the first day, 23% on the second day, and 27% the third day. what percent was collected on the fourth day?
11. Multiply using fractional numbers of the form $\frac{a}{b}$.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	11. Give the product: a. $\frac{3}{4} \times \frac{1}{5}$ b. $1\frac{5}{7} \times \frac{3}{4}$ c. $1\frac{4}{3} \times \frac{5}{9}$

Course or Grade: Eighth Average and Low

Concept: Operations with Fractional Numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
12. Express in simplest form the answer to a problem, involving the multiplication of 2 fractional numbers.	Lecture and illustration Chalkboard Directed activity	12. Name the product in its simplest form. a. $\frac{4}{5} \times \frac{7}{8}$ b. $\frac{5}{9} \times \frac{18}{25}$ c. $\frac{16}{19} \times \frac{19}{32}$
13. Multiply using mixed numerals.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	13. Give the product in simplest form. a. 2 1/3 x 2 ¼ b. 5 2/3 x 1 3/4 c. 5 x 4 7/9
14. Use rounding to the nearest whole number, to estimate the product of mixed numerals.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	14. Estimate the product, by rounding both numbers to the nearest whole number. a. 6 5/6 x 4 ¼ b. 7½ x 4 3/8 c. 16 1/16 x 19 3/4

Course or Grade: Eighth Average and Low

Concept. Operations with Fractional Numbers

Objective: ___

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
15. Multiply 2 numbers expressed in decimal form.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	15. Name the product: a. 4.63 x .7 b. 1.08 x .32 c. .0052 x .021
16. Round to the nearest whole number to estimate the product of 2 decimal numerals.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	16. Estimate the product by rounding both numbers to the nearest whole number. a. 6.25 x 2.8 b. 36.34 x 4.81 c. 297.9 x 36.4
17. Solve verbal problems involving multiplication with decimals or percents.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	17. Solve the following word problems: a. Scrap newspaper is made into sheets of cardboard .142 cm thick, and packaged 120 sheets to a carton. How high is a carton of the cardboard?

Course or Grade: Eighth Average and Low

Concept: Operations with Fractional Numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
17. cont.		17. cont. b. Golf clubs marked at $125 a set were on sale at 80% of the marked price. What was the sale price?
18. Divide using fractional numbers of the form a/b.	Lecture and illustration Chalkboard Directed activity	18. Give the quotient in simplest form. a. 4 ÷ 1/3 b. 3/4 ÷ 1/5 c. 5/14 ÷ 3/4
19 Divide using mixed numerals.	Lecture and illustration Chalkboard Directed activity	19. Give the quotient in simplest form. a. 3 2/3 ÷ 4 3/8 b. 5 2/3 ÷ 2 2/5 c. 3 2/9 ÷ 5 3/7

Course or Grade: Eighth Average and Low

Concept: Operations with Fractional Numbers

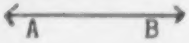
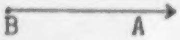
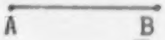
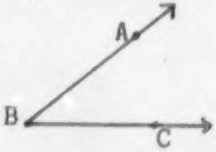
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
20. Divide with decimal numerals.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	20. Name the quotient: a. 3.5 ÷ .5 b. $4\overline{)7.2}$ c. .91 ÷ .07 d. $.09\overline{)15.3}$

urse or Grade: Eighth Average and Low

ncept: Measurement and Geometry

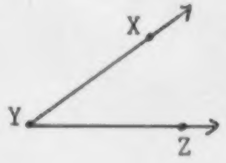
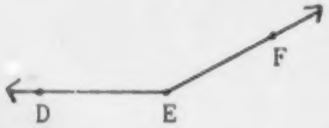
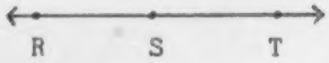
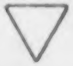
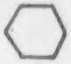
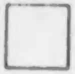
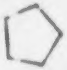
jective: At the conclusion of this unit, students will demonstrate a knowledge of measurement and geometry. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
. Recognize the different names, drawings, and symbols for the basic geometric ideas.	Lecture and illustration Chalkboard Directed activity	1. Match the following: a.____  b.____  c.____  d.____  e.____ the unit used to measure angles f.____ the instrument used to measure angles 1. ∠ABC 2. ray BA 3. line AB 4. $\overline{AB}$ 5. protractor 6. degree

Course or Grade: Eighth Average and Low

Concept: Measurement and Geometry

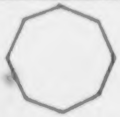
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
2. Use a protractor to measure angles.	Lecture and illustration Chalkboard Directed activity Teacher-made worksheets Chalkboard protractor	2. Indicate the measure of the following angles a.  b.  c. 
3. Recognize and identify different polygons.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	3. Match the following: a.____  b.____  c.____  d.____ 

Course or Grade: Eighth Average and Low

Concept: Measurement and Geometry

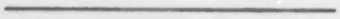
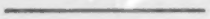
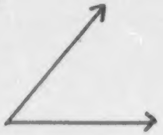
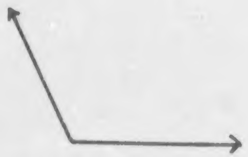
Objective: ____

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
3. Continued		e. ____  1. octagon 2. triangle 3. quadrilateral 4. pentagon 5. hexagon
4. Memorize different terms associated with measurement.	Lecture and illustration Chalkboard Directed activity	4. Fill in the blanks: a. Two line segments or two angles are ________ if they have the same measures in the same unit. b. The ________ of a measurement depends on the size of the unit we use. c. The ________ ________ ________ for a stated measurement is half the unit of measure.

Course or Grade: Eighth Average and Low

Concept: Measurement and Geometry

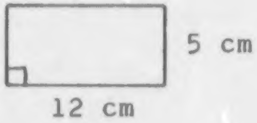
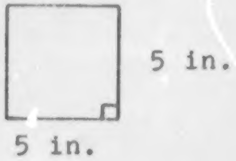
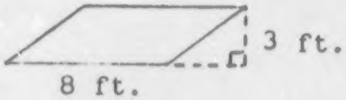
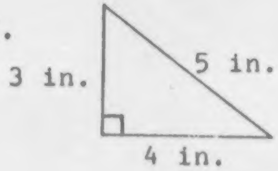
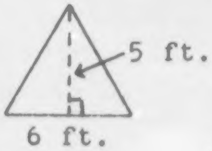
Objective: ______________________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
5. Use a compass and ruler to construct circles of given radius or diameter.	Lecture and illustration Chalkboard Directed activity Chalkboard rule Chalkboard compass Houghton Mifflin duplicating masters	5. Construct circles using the following information: a. radius = 3.5 cm b. diameter = 4 inches
6. Using a compass and straight edge, bisect given line segments.	Lecture and illustration Chalkboard Directed activity Chalkboard compass and straightedge Chalkboard rule	6. Use your compass and straightedge to bisect the following line segments: a.  b. 
7. Using a compass and straightedge, bisect given angles.	Lecture and illustration Chalkboard Directed activity Chalkboard compass and straightedge Chalkboard rule	7. Use your compass and straightedge to bisect the following angles. a.  b. 

Course or Grade: Eighth Average and Low

Concept: Measurement and Geometry

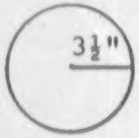
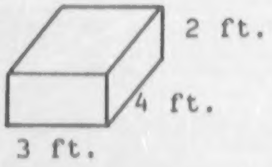
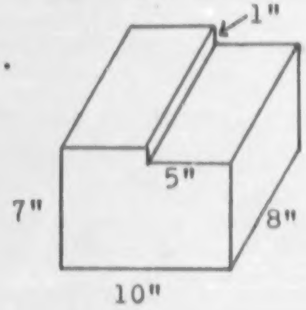
Objective: ____________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
8. Memorize and use the formulas for finding the area of different plane figures.	Lecture and illustration Chalkboard Directed activity Teacher-made worksheets	8. Find the area of the following plane figures. a.  b.  c.  d.  e. 

Course or Grade: Eighth Average and Low

Concept: Measurement and Geometry

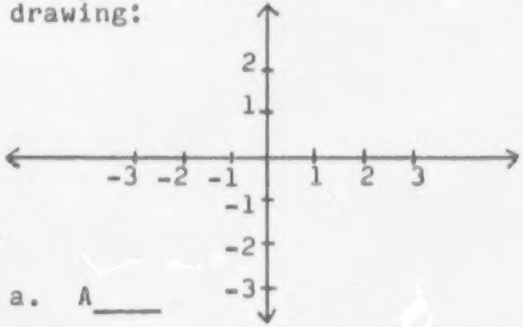
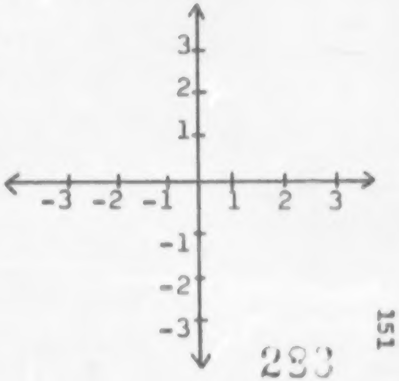
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
8. Continued		8. Continued f. 
9. Memorize and use the formula for finding the volume of a rectangular prism.	Lecture and illustration Chalkboard Directed activity Teacher-made worksheets Houghton Mifflin duplicating masters	9. Find the volume for the following: a.  b. A rectangular prism with these dimensions: l = 5 inches, w = 3 inches, h = 8 inches. c. 

Course or Grade: Eighth Average and Low

Concept: Measurement and Geometry

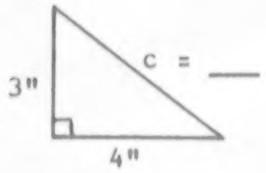
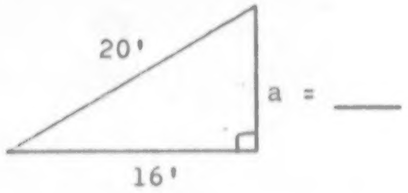
Objective: ____________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
10. Determine ordered pairs for a rectangular coordinate system.	Lecture and illustration Chalkboard Directed activity Teacher-made graph paper Chalkboard grid	10. Give the ordered pairs for the points shown in this drawing:  a. A____ b. B____ c. C____ d. D____
11. Graph given ordered pairs on a rectangular coordinate system.	Lecture and illustration Chalkboard Directed activity Teacher-made graph paper Chalkboard grid	11. Graph and label the given ordered pairs on a rectangular coordinate system. a. (1, -2) b. (-2,-2) c. (0, 3) 

Course or Grade: Eighth Average and Low

Concept: Measurement and Geometry

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
12. Determine the length of a side of a right triangle, using the Theorem of Pythagoras.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	12. Using the Pythagorean Theorem, find the measure of the indicated side. a.  b. 

Course or Grade: Eighth Average and Low

Concept: Operations with Fractional Numbers

Objective: At the conclusion of this unit, students will demonstrate a knowledge of operations with fractional numbers. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Multiply a number expressed in decimal form by a whole number.	Lecture and illustration Chalkboard Directed activity	1. Name the product a. .7 x 60 b. .06 x 2300
2. Solve verbal problems involving fractional numbers, percents.	Lecture and illustration Chalkboard Directed activity	2. Solve the following: a. Tom spent 33 1/3% of his $12 allowance for tickets to the movies. What was the cost of the tickets? b. A farmer took 55 bushels of potatoes to market. He sold 44 bushels. Name the part he sold as a decimal, and as a percent.
3. Solve problems involving discount,	Lecture and illustration Chalkboard Directed activity	3. Complete the table.

marked price	$65	$25	$90
rate of discount, as a % of the marked price.	40%	10%	33 1/3%
$ amt. of discount			
reduced price			

Course or Grade: Eighth Average and Low

Concept: Operations with Fractional Numbers

Objective:

<table>
<tr><th>LEARNER OUTCOMES</th><th>MATERIALS/METHODS</th><th>EVALUATION</th></tr>
<tr><td>4. Solve problems involving commission.</td><td>Lecture and illustration
Chalkboard
Directed activity
Houghton Mifflin duplicating masters</td><td>4. Complete the table.
<table>
<tr><td>Total sales</td><td>$250</td><td>$376</td><td>$720</td></tr>
<tr><td>Rate of commission as a %</td><td>20%</td><td>28%</td><td></td></tr>
<tr><td>$ commission</td><td></td><td></td><td>$90</td></tr>
</table></td></tr>
<tr><td>5. Memorize and use the formula for finding simple interest.</td><td>Chalkboard
Directed activity
Lecture and illustration
Houghton Mifflin duplicating masters</td><td>5. Complete the table.
<table>
<tr><td>Principal</td><td>$250</td><td>$800</td><td>$600</td></tr>
<tr><td>Rate</td><td>8%</td><td>5%</td><td>10%</td></tr>
<tr><td>Time</td><td>3</td><td>6</td><td></td></tr>
<tr><td>Interest</td><td></td><td></td><td>300</td></tr>
<tr><td>Amount to be repaid</td><td></td><td></td><td></td></tr>
</table></td></tr>
<tr><td>6. Find what percent one number is of another.</td><td>Lecture and illustration
Chalkboard
Directed activity
Houghton Mifflin duplicating masters</td><td>6. Find the number of percent:
a. What percent of 4 is 3?
b. 78 is ______ of 130
c. 3 is ______ of 1000</td></tr>
</table>

Course or Grade: Eighth Average and Low

Concept: Operations with Fractional Numbers

Objective: ____________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
7. Find a number when a percent of it is known.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	7. Find the missing number. a. 24% of what number is 6? b. 75% of what number is 363? c. 33 1/3% of what number is 42?
8. Given scientific notation, write the compact numeral.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	8. Write the compact numeral. a. 4.6×10^{2} b. 2.3×10^{-3} c. 5.00×10^{4}
9. Given the compact numeral, write in scientific notation.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	9. Write in scientific notation a. 4700 b. .0005 c. .02003 d. 73,215

Course or Grade: Eighth Average and Low

Concept: Factors and Multiples

Objective: At the conclusion of this unit, students will demonstrate a knowledge of factors and multiples. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Name the factors of a number.	Lecture and illustration Chalkboard Directed activity	1. List the whole number factors of: a. 18 b. 225
2. Identify prime numbers.	Lecture and illustration Chalkboard Directed activity	2. Give 2 prime numbers whose product is: a. 33 b. 91 c. 187 Name the number as the sum of 2 primes in as many ways as you can. a. 10 b. 36 c. 72
3. Find the prime factorization of any given number, using a factor tree.	Lecture and illustration Chalkboard Direct activity Houghton Mifflin duplicating masters	3. Use a factor tree to find the prime factorization of: a. 45 b. 140

Course or Grade: Eighth Average and Low

Concept: Factors and Multiples

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Name the common factors and the GCF of 2 or more numbers	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	4. List the factors of the numbers, the common factors, and the greatest common factor. a. 36 and 42 b. 36, 32, and 30
5. Use the prime factorization to find the GCF of any 2 numbers.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	5. Write the prime factorization for the numbers. Then name the GCF. a. 30 and 42 b. 126 and 420
6. Name the multiples of a number.	Lecture and illustration Chalkboard Directed activity	6. List the first 10 multiples of: a. 8 b. 9

Course or Grade: Eighth Average and Low

Concept: Factors and Multiples

Objective: ____________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
7. Use divisibility rules.	Lecture and illustration Chalkboard Directed activity Teacher made work-sheets	7. Write yes or not to show whether the given number is divisible by each of the following. 217,896 a. 2____ e. 6__________ b. 3____ f. 8__________ c. 4____ g. 9__________ d. 5_____ h. 10__________
8. Name the common multiples and the LCM (least common multiple) of 2 or more numbers.	Lecture and illustration Chalkboard Directed activity Teacher made work-sheets	8. List the common multiples, less than 100 of the numbers. Then name the LCM. a. 10 and 15 b. 6, 9, and 15
9. Use the prime factorization to find the LCM of any 2 numbers.	Lecture and illustration Chalkboard Directed activity Teacher made work-sheets	9. Write the prime factorization for the numbers. Then name the LCM. a. 12 and 15 b. 27 and 36

Course or Grade: Eighth Average and Low

Concept: Factors and Multiples

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
10. Use exponents, powers.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	10. Give the final result for: a. 2^3 b. 5^2 c. 32^3
11. Name the square or cube root of a number by inspection and/or trial and error.	Lecture and illustration Chalkboard Directed activity	11. Give either the square root or cube root as indicated. a. $\sqrt{49}$ b. $\sqrt[3]{64}$ c. $\sqrt{484}$ d. $\sqrt[3]{1728}$
12. Use the divide - and - average method to find the square root.	Lecture and illustration Chalkboard Directed activity	12. Find the square root of the given numbers, using the divide and average method. a. 676 b. 961 c. 1296

Course or Grade: Eighth Average and Low

Concept: Integers

Objective: At the conclusion of this unit, students will demonstrate a knowledge of integers. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Graph given integers on a number line.	Lecture and illustration Chalkboard Directed activity	1. Graph and label the following: a. 0 b. +3 c. -4
2. Place any number of integers in correct order from smallest to largest.	Lecture and illustration Chalkboard Directed activity Teacher-made work-sheet	2. Write the integers in order beginning with the smallest. a. +12, +8, -9, -7, +1, -6, +6 b. +173, +127, +83, -83, -127, -145
3. Name the absolute value of any given number or number phrase.	Lecture and illustration Chalkboard Directed activity	3. Give the abolute value. a. $\lvert +81 \rvert$ b. $\lvert -531 \rvert$ c. $\lvert +3 + -61 \rvert$ d. $\lvert -3 + -41 \rvert$

Course or Grade: Eighth Average and Low

Concept: Integers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Add any 2 integers.	Lecture and illustration Chalkboard Directed activity Teacher made work-sheet	4. Add the following: a. $^{+}2 + {}^{+}2$ b. $^{-}3 + {}^{-}8$ c. $^{+}2 + {}^{-}9$ d. $^{-}150 + {}^{+}147$
5. Subtract any 2 integers, by adding the opposite.	Lecture and illustration Chalkboard Directed activity Teacher made work-sheet Houghton Mifflin duplicating masters	5. Write the subtraction as an addition using the additive inverse. Then name the sum: a. $^{+}8 - {}^{+}6$ b. $^{+}15 - {}^{-}3$ c. $^{-}11 - {}^{-}22$ d. $^{-}35 - {}^{+}15$

Course or Grade: Eighth Average and Low

Concept: Integers

Objective: ____________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
6. Recognize important ideas and/or properties of integers.	Lecture and illustration Chalkboard Directed activity	6. Match the following: a_____Addition "undoes" subtraction and subtraction "undoes" addition. Addition and subtraction are called __________ __________. b___For any integer a, a + 0 = 0 + a = a. Therefore, zero is the __________ __________ for the set of integers. c____ One number is the __________ __________ of another number, if the sum of the two numbers is zero. d____Adding an integer is the same as subtracting its __________. 1. opposite 2. additive inverse 3. inverse operations 4. additive identity

Course or Grade: Eighth Average and Low

Concept: Integers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
7. Multiply with integers.	Lecture and illustration Chalkboard Directed activity Teacher-made worksheets	7. Name the product: a. $^{-}3$ X $^{+}8$ b. $^{+}7$ X $^{-}9$ c. $^{+}20$ X $^{+}12$ d. $^{-}12$ X $^{-}6$
8. Divide with integers.	Lecture and illustration Chalkboard Directed activity Teacher-made worksheets Houghton Mifflin duplicating masters	8. Name the quotient: a. $^{-}96 \div {}^{-}12$ b. $^{+}72 \div {}^{+}6$ c. $0 \div {}^{+}98$ d. $^{-}73 \div {}^{+}73$
9. Recognize the difference in fractional numbers and rational numbers.	Lecture and illustration Chalkboard Directed activity	9. Match the following: a____The quotient of 2 whole numbers a and b ($b \neq 0$) is a ________ ________. b____The quotient of 2 integers a and b ($b \neq 0$) is called a ________ ________. 1. rational number 2. fractional number

Course or Grade: Eighth Average and Low

Concept. Integers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
10. Name a rational number between any 2 given rational numbers.	Lecture and illustration Chalkboard Directed activity	10. Give a rational number between each pair of numbers. a. $(^{+}3/5,\ ^{+}4/5)$ b. $(^{-}2/3,\ ^{-}5/6)$ c. $(-.25,\ -.26)$
11. Add rational numbers.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	11. Find the sum. a. $^{+}2/3 + {}^{+}3/4$ b. $^{-}12/7 + {}^{+}1\ 5/7$ c. $^{-}7/8 + {}^{-}9/16$
12. Subtract with rational numbers.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	12. Find the difference. a. $^{-}3/4 - {}^{+}2/3$ b. $^{-}4/7 - {}^{-}9/14$ c. $^{+}1\ 5/6 - {}^{-}2\ 2/3$

Course or Grade: Eighth Average and Low

Concept: Integers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
13. Multiply with rational numbers.	Lecture and illustration Chalkboard Directed activity	13. Find the product: a. $^{-}3/4 \times {}^{-}5/7$ b. $^{+}7/8 \times {}^{-}3/4$ c. $-6\ 2/3 \times {}^{+}3\ 1/4$
14. Divide with rational numbers.	Lecture and Illustration Chalkboard Directed activity	14. Find the quotient: a. $^{+}9/10 \div {}^{-}5/6$ b. $-3/4 \div {}^{-}5/7$ c. $^{+}3\ 1/4 \div {}^{-}5\ 2/3$

Course or Grade: Eighth Average and Low

Concept: Statistics and Probability

Objective: At the conclusion of this unit, students will demonstrate a knowledge of statistics and probability. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Determine the average (mean) of a set of numbers.	Lecture and illustration Chalkboard Directed activity	1. Name the average to the nearest whole number. a. 48, 27, 39, 51, 64, 25 b. The sum of 6 of the numbers is 114, and the sum of the other seven is 120.
2. Determine the median of a set of numbers.	Lecture and illustration Chalkboard Directed activity	2. Name the median: a. 31, 31, 27, 27, 48, 39, 41 b. 27, 86, 39, 81, 61, 72, 73, 61
3. Determine the mode of a set of numbers.	Lecture and illustration Chalkboard Directed activity	3. Name the mode of the given sets of numbers: a. 21, 26, 24, 24, 28, 31, 24 b. 56, 48, 47, 56, 28, 59, 41, 47

Course or Grade: Eighth Average and Low

Concept: Statistics and Probability

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Name the probability of an event as a fraction or a percent.	Lecture and illustration Chalkboard Directed activity Bulletin board game, where students must pick a "door" knowing what the probability of getting something "good" will be. A different students' name is drawn from "the hat" each day.	4. If you have 10 cards numbered 1 - 10, what is the probability of picking: (Give your answer as a fraction and percent). a. P(8) b. P(3 or 8) c. P(even number)
5. Name the probability of dependent events as a fraction.	Lecture and illustration Chalkboard Directed activity	5. Find the probability for the following. Give your answer as a fraction in simplest form. There are 12 discs in a box: 5 blue (B) 4 white (W), 2 green (G), and 1 red (R). a. P(B,B) b. P(W,R) c. P(R,G,W,B)

Course or Grade: Eighth Average and Low

Concept: Statistics and Probability

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
6. Name the odds for or against an event.	Lecture and illustration Chalkboard Directed activity Houghton Mifflin duplicating masters	6. For $\{2,3,4,6,7,8,9,10,12,13\}$, name the odds in favor of picking: a. a multiple of 3 b. an even number or a multiple of 4 For $\{2,3,4,6,7,8,9,10,12,13\}$, name the odds against each outcome. a. a multiple of 4 b. an even number or a multiple of 3
7. Use a representative sample to name a probability.	Lecture and illustration Chalkboard Directed activity	7. Solve the following: a. Three out of 100 cans are likely to be damaged in shipping. About how many are likely to be damaged in a shipment of 2500? b. Five out of eight people answer "yes" to the question, "Do you use Highlight Tooth Paste?" About how many people out of a group of 8000 are likely to answer "yes"?

Course or Grade: Eighth Average and Low and High

Concept: Metric System

Objective: At the conclusion of this unit, students will demonstrate a knowledge of the metric system. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Know the main reasons for going to the metric system of measurement.	Lecture Chalkboard Study sheets	1. Name 3 major reasons in favor of using the metric system.
2. Memorize the basic prefixes and the numbers each prefix stands for.	Lecture and illustration Chalkboard Study sheets Game to see who can say prefixes in correct order the fastest.	2. List the prefixes from smallest to largest and give the number each is equal to.
3. Memorize the basic units of measurement.	Lecture and illustration Chalkboard Study sheets	3. Give the basic unit of: a. length b. weight c. capacity
4. Choose the best unit (most logical) to use for the different measurements.	Lecture and illustration Chalkboard Study sheets In reviewing our notes, we make a timed game out of this also.	4. Indicate the best unit to measure the following: a. your weight b. your height c. length of a pencil d. distance across the U.S. e. gasoline

Course or Grade: Eighth Average and Low and High

Concept: Metric system

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
5. Memorize information about the metric temperature scale.	Lecture and illustration Chalkboard Study sheets	5. Give the following information about the metric temperature scale: a. name b. freezing point c. boiling point d. normal body temperature
6. Use symbols and words interchangeably.	Lecture and illustration Chalkboard Study sheets	6. Match the following symbols and words: a. ____ millimeter b. ____ kilogram c. ____ dekaliter d. ____ square centimeter e. ____ cubic decimeter f. ____ kilometer g. ____ gram 1. g 4. mm 7. dal 2. cm^2 5. dm^3 3. km 6. kg

Course or Grade: Eighth Average and Low and High

Concept: Metric system

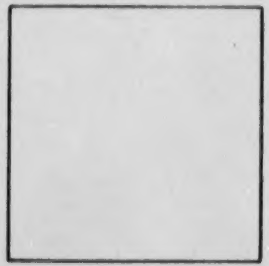
Objective: ________________________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
7. Know the approximations (in terms of our present system) of the most commonly used metric units.	Lecture and illustration Chalkboard Worksheets	7. Give the approximations in terms of our present system: a. 1 centimeter ≈ ________ b. 1 kilometer ≈ ________ c. 1 kilogram ≈ ________ d. 1 liter ≈ ________ e. 1 meter ≈ ________
8. Recognize different units which could be used to measure land area, depending upon the size.	Lecture and illustration Chalkboard Worksheets	8. Answer the following questions about land area: a. What unit will be most common in measuring land area, and will replace the "acre"? b. 1 hectare ≈ ______acres c. 1 hectare = ______ares d. If this drawing represents 1 are, what are its dimensions, in meters?

Course or Grade: Eighth Average and Low and High

Concept: Metric system

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
8. Continued		8. Continued  If this drawing represents one hectare, what are its dimensions, in meters?
9. Know that all metric units are interrelated, and be able to go from a unit of capacity to a unit of volume (based on lengths) to a unit of weight.	Lecture and illustration Chalkboard Worksheets Balance scales Liter containers, etc. Cubic decimeter containers Meter sticks Centimeter tape measures	9. Fill in the blanks with the best answer: a. 1 liter = 1 ______ ______ b. 1 liter of chemically pure water at 4° C will weigh 1 ________. c. 1 milliliter = 1 ______ ______ d. 1 cm^3 of chemically pure water at $4^{\circ}C$ will weigh 1 ________.

Course or Grade: Eighth Average and Low and High

Concept: Metric System

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
10. Estimate the length in centimeters of line segments drawn on a sheet of paper.	Students are to use a metric ruler first to get the basic idea of different lengths (mm, cm, dm) Then the rulers are taken away Study sheets	10. Estimate to the nearest whole centimeter the length of each line segment. a. ____________________ b. _________ c. ______________ d. ____
11. Convert from one unit in the metric system to other units in the metric system.	Lecture and illustration Chalkboard Teacher-made worksheets Timed games	11. Fill in the blanks: a. 1 mm = ____ cm = ____dm b. 40 km = ____ hm = ____m c. 2 cl = ____ ml = ____l d. 6.6 g = ____dal = ____dg e. 146 l = ____dm^3 f. 17ml = ____dm^3 g. 20dm^3 = ____ml h. 13cm^3 = ____dl

Course or Grade: Eighth Average and Low and High

Concept: Metric System

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
12. Add metric quantities which have the same base unit.	Lecture and illustrations Chalkboard Teacher-made worksheets Cross-number puzzles Timed games	12. Add the following: a. 3 m + 12.8 m = ____m b. 17 g + 150dg = ____cg c. .078dal + 3.98 l = _____dl d. 356 mg + 39.8 cg = _____mg
13. Subtract metric quantities, which have the same base unit.	Lecture and illustration Chalkboard Teacher-made worksheets Cross-number puzzles Timed games	13. Subtract the following: a. 8.3 l - 2.5 dl = ____dl b. 7 m - 198 cm = _____dm c. 798 mg - 3.09 dg = _____cg
14. Convert from square centimeters to square decimeters, and vice versa.	Lecture and illustration Chalkboard Teacher-made worksheets	14. Fill in the blanks: a. $100cm^2$ = _____dm^2 b. $750cm^2$ = _____dm^2 c. 2 dm^2 = _____cm^2 d. $5.25dm^2$ = _____cm^2

Course or Grade: Eighth Average and Low and High

Concept: Metric system

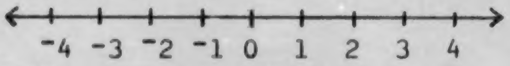
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
15. Convert from cubic centimeters to cubic decimeters, and vice versa.	Lecture and illustration Chalkboard Teacher-made worksheets	15. Fill in the blanks: a. $2\ dm^3$ = _____ cm^3 b. $7000\ cm^3$ = _____ dm^3 c. $3500\ cm^3$ = _____ dm^3
16. Convert from cubic decimeters to units of capacity (l, ml, etc.) and vice versa.	Lecture and illustration Chalkboard Teacher-made worksheets	16. Fill in the blanks: a. 25 l = _____ dm^3 b. $7.5\ dm^3$ = _____ l c. 2 dal = _____ dm^3 d. $17\ dm^3$ = _____ ml

Course or Grade: Eighth High

Concept: Positive and Negative Numbers

Objective: At the conclusion of this unit, students will demonstrate a knowledge of positive and negative numbers. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Construct a number line and graph a given set of rational numbers on it.	Lecture and illustration Chalkboard Directed activity Programmed practice	1. On a number line, graph the set $\{^-3, ^-\frac{1}{2}, 0, ^+1\}$
2. State the opposite of any given number, and graph the number and its opposite.	Play "Opposites" game	2. a. Write a numeral for the opposite of $^+16.4$. b. On the number line below, graph the opposite of $-(^-3\ 1/2)$ 
3. Use set symbols to indicate various subsets of a given set of numbers.	Lecture and illustration Chalkboard Programmed practice	3. a. Specify by roster the subset of $T = \{^-2, ^-1, 0, 1, 2\}$ that consists of all integers in T that are not positive. b. Replace ____ with $\in$ or $\notin$ to make $^-5$ ____ N a true statement.
4. Use set notation to specify the union and the intersection of two given sets.	Lecture and illustration Chalkboard Programmed practice	4. $A = \{^-1, 0, ^+1\}$ and $B = \{^-2, 0, 2\}$ a. Specify by roster $A \cap B$. b. Specify by roster $A \cup B$.

Course or Grade: Eighth High

Concept: Positive and Negative Numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
5. Use the concept of set union to give a definition of the set R of rational numbers.	Lecture and illustration Overhead projector Chalkboard Directed activity	5. Set A denotes the set of nonnegative rational numbers and set B denotes the set of the negatives of the members of set A. Write in symbol form the definition of R.
6. Write whether or not a given number is a member of the set of N (Natural), J (Integers) A (Nonnegative fractional numbers), or R (Rational)	Lecture and illustration Overhead projector Chalkboard Directed activity	6. Replace ____ with $\in$ or $\notin$ to make a true statement. $+\frac{5}{4}$ ___ A $+\frac{3}{4}$ ___ R $\frac{2}{3}$ ___ J $-\frac{2}{5}$ ___ A $-\frac{1}{2}$ ___ N 0 ___ R
7. Write fractions that are equivalent to a given fraction.	Lecture and illustration Overhead projector Chalkboard Directed activity	7. Replace n with a numeral to make a true statement, then write an equivalent fraction: a. $\frac{6}{9} = \frac{6 \div 3}{9 \div n}$ b. $\frac{2}{11} = \frac{n \times 13}{11 \times 13}$

Course or Grade: Eighth High

Concept: Positive and Negative Numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
8. Reduce a fraction to lowest terms by dividing numerator and denominator by their GCF.	Lecture and illustration Overhead projector Chalkboard Directed activity	8. State in lowest terms: a. $-\frac{70}{105}$ b. $\frac{24}{148}$ c. $-\frac{64}{36}$ d. $\frac{72}{160}$
9. Find the LCM of two given whole numbers.	Lecture and illustration Overhead projector Chalkboard Directed activity	9. a. What is the LCM of 12 and 20? b. What is the LCM of 34 and 51?
10. Replace two fractions having different denominators with equivalent fractions having a least common denominator.	Lecture and illustration Overhead projector Chalkboard Directed activity	10. Replace the fractions -3/8 and -7/12 with equivalent fractions having a least common denominator.
11. Compare two rational numbers by observing the location of their graphs on a number line.	Lecture and illustration Overhead projector Chalkboard Directed activity	11. Graph the rational numbers +4, -3/2, 7/2, 0, -5 on a number line. Then write them in increasing order, from least to greatest.

Course or Grade: Eighth High

Concept: Addition and Subtraction

Objective: At the conclusion of this unit, students will demonstrate a knowledge of addition and subtraction. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find the sum of two given rational numbers named by fractions.	Lecture and illustration Overhead projector Chalkboard Directed activity	1. Find the sum of -2/3 and 1/6 and express the answer in lowest terms.
2. Find the sum of two given rational numbers that are named by mixed numerals, and express the sums in lowest terms.	Lecture and illustration Overhead projector Chalkboard Directed activity	2. Express the sum of -1 1/5 and $^{+}3\ 3/10$ in lowest terms.
3. State the closure, commutative, associative, additive-identity, and additivie-inverse properties of the set of rational numbers under the binary operation of addition, and apply these properties in computing sums.	Lecture and illustration Overhead projector Chalkboard Directed activity	3. Tell why each statement is true, giving a property of addition in the set R as your reason. a. $^{+}5/8 + 0 = {}^{+}5/8$ b. $(^{+}2/3 + {}^{-}1/6) + {}^{+}1/6 = {}^{+}2/3 + ({}^{-}1/6 + {}^{+}1/6)$
4. Find the difference of two given integers.	Lecture and illustration Overhead projector Chalkboard Directed activity	4. Find the difference: a. $^{-}12 - {}^{-}14 =$ ____ b. $^{-}17 - {}^{-}15 =$ ____

Course or Grade: Eighth High

Concept: Addition and Subtraction

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
5. Find the difference of two integers by first expressing the difference as a sum.	Lecture and illustration Overhead projector Chalkboard Directed activity	5. a. Write the difference $^{+}21 - {}^{+}13$ as a sum. b. Write the sum $^{+}14 + {}^{-}6$ as a difference.
6. Determine the output corresponding to a given input for a specified function machine, and to write the printout as an ordered pair.	Lecture and illustration Overhead projector Chalkboard Directed activity	6. a. If the inputs of an "Add 1 1/3" machine are -2/3, 0, and 2, what are the corresponding outputs? b. Name the machine and write the set of ordered pairs for the mapping 6 → 4, -1 → -3, 0 → -2.
7. Decide whether or not a simple set of ordered pairs is a function, and if it is, to state its domain, its range, and a function rule.	Lecture and illustration Overhead projector Chalkboard Directed activity	7. a. Is the set of ordered pairs a function $\{(1,0), (2\ 1/2, 1\ 1/2), (5,4)\}$? b. If the range of a function is $\{6, 3\ 1/2, 0, -1\}$ and the rule is "Add -2," what is the domain?
8. Solve simple word problems involving the operations of addition and subtraction.	Lecture and illustration Overhead projector Chalkboard Directed activity	8. The temperature this morning at 3:00 was $^{+}3^{\circ}$. By 5:00 the temperature had dropped $7\ 1/2^{\circ}$. What was the temperature at 5:00?

Course or Grade: Eighth High

Concept: Multiplication and Division

Objective: At the conclusion of this unit, students will demonstrate a knowledge of multiplication and division. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Express sums of equal whole number addends as products.	Lecture and illustration	1. Express the sum 3 + 3 + 3 + 3 as a product.
2. Use the distributive property in finding products of whole numbers.	Lecture and illustration Directed activity Chalkboard Questioning Overhead projector Programmed practice	2. Replace ____ with an integer to make a true statement. a. 7 X (5 + 8) = 35 + ____ b. 8 X (__ + 5) = 80 + 40 c. __(5 + 12) = 20 + 48
3. Find the product of a whole number and a negative integer.	Lecture and illustration Directed activity Chalkboard	3. Simplify: a. $8(^{-}7)$ b. $5\left[^{-}9 + (^{-}3)\right]$
4. Find the product of two negative integers.	Lecture and illustration Directed activity Chalkboard	4. Simplify: a. $(^{-}11)(^{-}13)$ b. $(^{-}8)\left[^{-}10 + (^{-}3)\right]$
5. Find the product of two rational numbers, whether positive or negative, and whether given by fractional, mixed, or decimal numerals.	Lecture and illustration Directed activity Chalkboard	5. Multiply: a. 3/7 X 2/5 b. $^{-}7/8$ X $^{-}2/21$ c. $^{-}2.1$ X ($^{-}3.2$ X $^{-}2.5$)

Course or Grade: Eighth High

Concept: Multiplication and Division

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
6. Write the reciprocal of a rational number.	Lecture and illustration Chalkboard Directed activity	6. What is the reciprocal of 3/5?
7. Use commutative, associative, multiplicative-identity, multiplicative inverse, or distributive, to indicate the property of set R under multiplication that is given.	Lecture and illustration Chalkboard Directed activity	7. State the property which justifies each of the following: a. 3/4(2/3 + 1/5) = (3/4 X 2/3) + (3/4 X 1/5) b. 2/7 X (3/5 X 1/2) = (2/7 X 3/5) X 1/2
8. Express the quotient of two integers as a rational number.	Lecture and illustration Chalkboard Directed activity	8. a. $-39 \div 3$ b. $^{-}255 \div -17$
9. Express the quotient of two rational numbers as a product in simplest form.	Lecture and illustration Chalkboard Directed activity	9. Simplify: a. $-3\ 3/4 \div {}^{-}1\ 7/8$ b. $({}^{-}2\ 1/3 \div 2\ 4/5) \times {}^{-}3/5$
10. Use the division algorithm and the rules of signs to compute quotients of rational numbers named by decimal numerals.	Lecture and illustration Chalkboard Directed activity	10. Divide: a. $2.565 \div 9$ b. $15.73 \div {}^{-}1.3$ c. $({}^{-}3.9 \times {}^{-}1.5) \div {}^{-}.13$

Course or Grade: Eighth High

Concept: Multiplication and Division

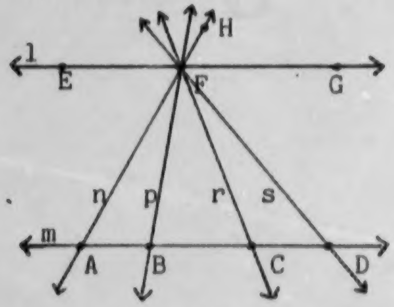
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
11. Express the ratio of two quantities of the same kind as a fraction in lowest terms.	Lecture and illustration Chalkboard Directed activity	11. Express each ratio as a fraction in lowest terms: a. 28:16 b. 4 dollars to 65 cents c. $\frac{\frac{7}{8}}{3}$
12. State and solve a proportion corresponding to a real-life problem.	Lecture and illustration Chalkboard Directed activity	12. If 12 gallons of gasoline costs \$3.84, what is the cost of 15 gallons of gasoline?

Course or Grade: Eighth High

Concept: Geometric Figures

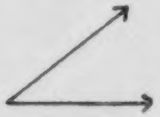
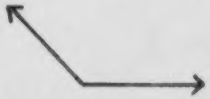
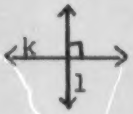
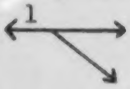
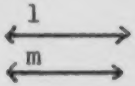
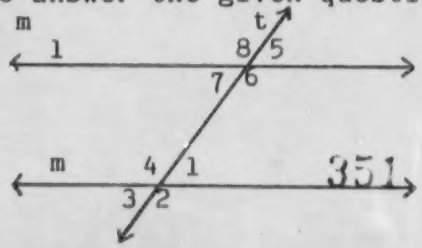
Objective: At the conclusion of this unit, students will demonstrate a knowledge of geometric figures. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify and designate points, line segments, lines, rays, and half-lines, and to measure line segments with a ruler.	Lecture and illustration Chalkboard Directed activity	1. Refer to the figure, where l ∥ m.  H l E F G n p r s m A B C D a. Name three line segments on l. b. Name two half-lines on line s. c. Name two rays on line p. d. With your ruler measure $\overline{AH}$, $\overline{BD}$ and $\overline{EF}$ + $\overline{FD}$.
2. Identify and designate angles, adjacent angles, vertical angles, supplementary angles, and complementary angles, and to measure angles with a protractor.	Lecture and illustration Chalkboard Directed activity Chalkboard rule Chalkboard protractor	2. Use the drawing above to answer the following: a. What angle is the supplement of ∠ ABF? b. ∠ EFA and which angle are vertical angles? c. ∠ BAF and which angle are alternate interior angles?

Course or Grade: Eighth High

Concept: Geometric Figures

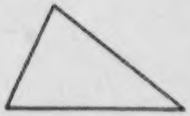
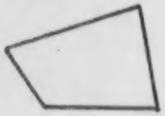
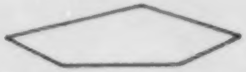
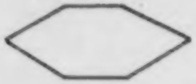
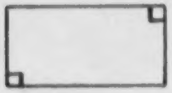
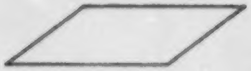
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
2. Continued		2. Continued d. Name two angles having the same measure as ∠ EFA e. With a protractor, measure the following angles:  
3. Identify parallel and perpendicular lines, and designate corresponding angles, exterior and interior angles, and alternate interior angles determined by a transversal.	Lecture and illustration Chalkboard Directed activity	3. From the drawings below, identify parallel and perpendicular lines. Write the symbol ∥ or ⊥ in the corresponding blank.  a.____  b.____  c.____
4. Measure angles when given the measures of related angles.	Lecture and illustration Chalkboard Directed activity	4. Use the following drawing to answer the given questions: l m 

Course or Grade: Eighth High

Concept: Geometric Figures

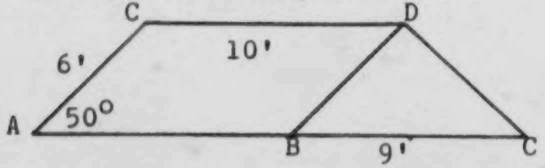
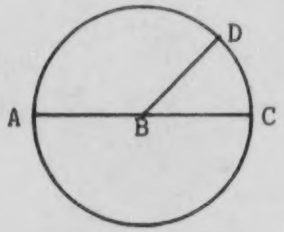
Objective: ____________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Continued		4. Continued a. Name two pair of corresponding angles. b. Name two pair of exterior angles. c. Name two pair of interior angles. d. Name two pair of alternate interior angles. e. Name three angles with the same measure as $\angle 2$. f. If $m\angle 1 = 40^\circ$, what is the measure of $\angle 7$?
5. Name a given polygon in accordance with the number of its sides and angles.	Lecture and illustration Chalkboard Directed activity	5. Name the following polygons:  a.______  b.______  c.______  d.______  e.______  f.______

Course or Grade: Eighth High

Concept: Geometric Figures

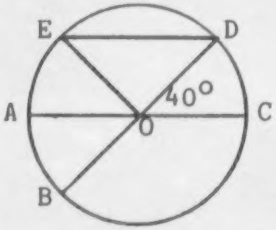
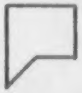
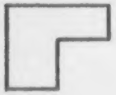
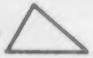
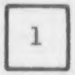
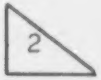
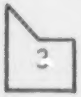
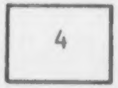
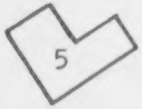
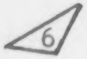
Objective: ____________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
6. Determine the length or angle measure of triangles and quadrilaterals in accordance with the given measure of their sides and angles.	Lecture and illustration Chalkboard Directed activity	6. Given: $\overline{ED} \parallel \overline{AC}$ and $\overline{AE} \parallel \overline{BD}$, find the following measures:  a. d($\overline{AC}$) = ____ b. m∠DBC = ____ c. m∠BDE = ____
7. Name radii, diameters, major arcs and minor arcs of circles.	Lecture and illustration Chalkboard Directed activity Chalkboard rule Chalkboard compass	7. Name the parts of the circle below. Place your answers in the corresponding blank.  a. $\overline{AC}$ = ____ b. $\overline{BD}$ = ____ c. $\overset{\frown}{AD}$ = ____ d. $\overset{\frown}{DCA}$ = ____

Course or Grade: Eighth High

Concept: Geometric Figures

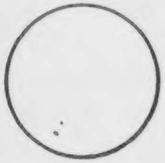
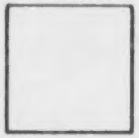
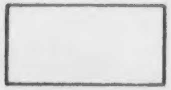
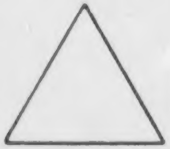
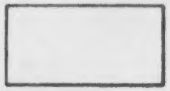
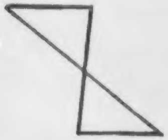
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
8. Relate degree measure of a circular arc to the degree measure of a corresponding central angle.	Lecture and illustration Chalkboard Directed activity Chalkboard rule Chalkboard compass Chalkboard protractor	8. Use the figure below, where $\overline{ED} \parallel \overline{AC}$ and $\overline{AC}$ and $\overline{BD}$ are diameters, to find the measure in degrees of:  a. $\angle OED$ = ____ b. $\overset{\frown}{BAE}$ = ____ c. $\overset{\frown}{BC}$ = ____
9. Pair congruent figures by observing their size and shape.	Lecture and illustration Chalkboard Directed activity	9. Pair each figure with a congruent figure from the collection at the right. a. __  b. __  c. __       

Course or Grade: Eighth High

Concept: Geometric Figures

Objective: ______________________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
10. Identify all lines of symmetry of a given plane figure by inspection.	Lecture and illustration Chalkboard Directed activity Chalkboard rule Chalkboard compass	10. Which of the figures below have a line(s) of symmetry?    a._____ b._____ c._____
11. Identify whether or not a given plane figure has a point of symmetry.	Lecture and illustration Chalkboard Directed activity Chalkboard rule Chalkboard compass	11. Which of the figures below have a point of symmetry?    a._____ b._____ c._____

Course or Grade: Eighth High

Concept: Exponents and Decimals

Objective: At the conclusion of this unit, students will demonstrate a knowledge of exponents and decimals. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify natural number powers of 10, and write a product of two of these powers as a single power of 10.	Lecture and illustration Chalkboard Overhead projector Directed activity	1. Write as a single power of 10. a. $10^4 \times 10^6$
2. Recognize integral powers of 10, and write a product of two of these powers as a single power of 10.	Lecture and illustration Chalkboard Directed activity	2. Write as a single power of 10. a. 10-3 X 10^{-8}
3. Write a quotient of integral powers of 10 as a single power of 10.	Lecture and illustration Chalkboard Directed activity	3. Write as a single power of 10. a. $10^8 \div 10^{-2}$ b. $10^{-3} \div 10^{-8}$
4. Write a decimal numeral in expanded form as the sum of multiples of powers of 10.	Lecture and illustration Chalkboard Directed activity	4. Write the following in expanded form as the sum of multiples of powers of 10. a. 982.72 b. .0012492

Course or Grade: Eighth High

Concept: Exponent and Decimals

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
5. Express a number, given by a decimal numeral, in scientific notation, and vice versa.	Lecture and illustration Chalkboard Directed activity	5. a. Express these decimal numerals in scientific notation. 1. 731.52 2. .00251 b. Express in decimal form: 1. 5.45×10^3 2. 4.24×10^{-5}

Course or Grade: Eighth High

Concept: Number Sentences

Objective: At the conclusion of this unit, students will demonstrate a knowledge of number sentences. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Translate a word phrase describing a numerical operation into a number phrase, and vice versa.	Lecture and illustration Chalkboard Directed study	1. a. Translate $3x + 2$ into a word phrase. b. Write an open number phrase for: the quotient when the sum of n and 3 is divided by x.
2. Evaluate an open number phrase containing one or more variables for specified numerical values of each variable.	Lecture and illustration Chalkboard Directed study	2. a. If $n = 2$, what is the value of $n^2 - 3n$? b. If $p = 3$, and $q = 1$, what is the value of $\frac{p^2 - 1}{2q}$?
3. Translate a word sentence describing numerical operations involving one or more variable into an open number sentence, and vice versa.	Lecture and illustration Chalkboard Directed activity	3. a. Translate into a number sentence: The difference when 4 is subtracted from n is 8. b. Translate into words: $n - 7 < 4$
4. Decide whether or not a given value of a variable is a solution of a given open number sentence in that variable.	Lecture and illustration Chalkboard Directed activity	4. a. If n is replaced by 2, is $8 - 2n > 3$ a true statement? b. Is $^-2$ a solution of the open sentence $x + 3 > 2$?

Course or Grade: Eighth High

Concept: Number Sentences

Objective: ____

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
5. Specify the solution set of a simple open sentence in one variable over a given replacement set for the variable.	Lecture and illustration Chalkboard Directed activity	5. a. Specify by roster the solution set over the negative integers for $2x + 5 > 0$. b. Specify by roster the solution set of $2x + 1 < 2$ over the replacement set $\{^-2, ^-1, 0, 1, 2\}$.
6. Demonstrate the addition and multiplication properties of equality in the case of simple number sentences in one variable.	Lecture and illustration Chalkboard Directed activity	6. a. If $x = 4$, then $3x - 5 =$ ____ b. If $a = 20$, then $\frac{a}{5} + 2 =$ ____
7. Solve a linear equation in one variable by transforming the equation into the form $x = c$.	Lecture and illustration Chalkboard Directed activity	7. Solve each of the following equations: a. $y + 3 = 7$ b. $3z + 2z = 20$ c. $2r + 1 = 5$ d. $\frac{1}{2}z = 4$

Course or Grade: Eighth High

Concept: Number Sentences

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
8. Solve a linear inequality in one variable by transforming it into an equivalent inequality whose solution set can be found simply by inspection.	Lecture and illustration Chalkboard Directed activity	8. Solve each inequality over J. a. $y + 1 > 10$ b. $\frac{2}{3}y \leq 6$ c. $-\frac{3}{5}x + 1 \geq {}^{-}2$ d. $5(x - 1) \leq 15$ e. $4a + 2 < a + 11$

Course or Grade: Eighth High

Concept: Problem Solving

Objective: At the conclusion of this unit, students will demonstrate a knowledge of problem solving. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Devise a word sentence expressing the numerical relationship given by a simple equation in one variable.	Lecture and illustration Chalkboard Directed activity	1. Write a practical problem that can be translated into the given number sentence: a. $y + 1 = 7$ b. $\frac{n}{4} = 28$
2. Write and solve an equation that represents the numerical facts in a word problem, and check whether or not the answer satisfies the statement of the problem.	Lecture and illustration Chalkboard Directed activity	2. Solve the following problems. Show the equation as well as the solution. Check your answers. a. A certain number is 5 less than 12. Find the number. b. Find two consecutive integers having 37 as their sum. c. Bill's age is 4 years more than twice Matt's age. If the difference in their ages is 5 years, how old is Matt?

Course or Grade: Eighth High

Concept: Problem Solving

Objective: ______

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
3. Solve the type of word problem that can be expressed by a simple formula.	Lecture and illustration Chalkboard Directed activity	3. If the number of acres of a lake (A) contaminated by the addition of (n) gallons of oil is given by A = .7n, how many gallons of oil would it take to contaminate 2114 acres?
4. Solve percent problems using the formula p = rb.	Lecture and illustration Chalkboard Directed activity	4. Find the missing number: a. 20% of 150 = ______ b. 16% of _____ = 48 c. 4 = _____% of 25
5. Solve word problems describing common, practical situations involving the use of percents.	Lecture and illustration Chalkboard Directed activity	5. a. The property tax in Greenville is 11.2%. How much is the property tax on a lot assessed at $1500? b. Helen's salary was increased from $2.00 per hour to $2.14 per hour. What was the percent of increase? c. David saves 15% of his weekly salary. Last week he saved $33. What is nis salary?

Course or Grade: Eighth High

Concept: Problem Solving

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
6. Explain what is meant by simple and compound interest, and solve word problems dealing with these two concepts.	Lecture and illustration Chalkboard Directed activity	6. a. Explain what is meant by simple interest. b. Explain what is meant by compound interest. c. Formost Loan Company charges 18% simple interest. How much interest will Fred pay if he borrows $500 for one year? d. Bill invested $200 in the City Savings and Loan. If they pay 5% interest compounded annually, how much money will Bill have after 2 years?
7. Solve word problems that describe typical family or personal budget situations.	Lecture and illustration Chalkboard Directed activity	7. a. Ed is saving $5.00 a week. How many weeks will it take him to save $125 for new tires? b. The insurance on Mark's car is $332.80 per year. How much should be budget a week for insurance?
8. Be able to solve simple word problems dealing with environmental factors.	Lecture and illustration Chalkboard Directed activity	8. If a water sample from the Santa Ana River contains 465 ppm of pollutants, what is the percent of pollutants in the river?

Course or Grade: Eighth High

Concept: Real Numbers

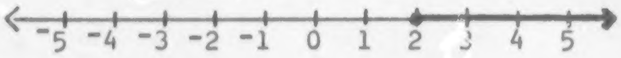
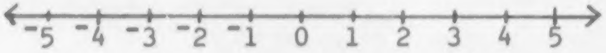
Objective: At the conclusion of this unit, students will demonstrate a knowledge of real numbers. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find an equivalent terminating or repeating decimal numeral for a rational number given in common fraction form.	Lecture and illustration Chalkboard Directed activity	1. a. Express 3/8 as a terminating decimal numeral. b. Express 5/6 as a repeating decimal numeral.
2. Convert common fractions to equivalent decimals, and vice versa, for common fractions whose denominators contain only powers of 2 and 5 as factors.	Lecture and illustration Chalkboard Directed activity	2. a. Express .25 as a fraction in lowest terms. b. Reduce $\frac{125}{1000}$ to lowest terms.
3. Find fractions in lowest terms equivalent to given repeating decimals, and express any terminating decimal numeral as a repeating decimal numeral.	Lecture and illustration Chalkboard Directed activity	3. a. Express $.\overline{4}$ as a fraction in lowest terms. b. Express $1.\overline{52}$ as a fraction in lowest terms. c. Express $^{-}2.0\overline{2}$ as a fraction in lowest terms.
4. Find a rational number between two given rational numbers, and find the average of two rational numbers.	Lecture and illustration Chalkboard Directed activity	4. a. Find a rational number between 3.4 and 3.5. b. Find the average of 4.51 and 4.52.

Course or Grade: Eighth High

Concept: Real Numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
5. Name an irrational number between two given rational numbers, and identify which of two numbers represented in decimal form is the greater.	Lecture and illustration Chalkboard Directed activity	5. a. Name an irrational number between .1 and .2. b. Which is greater, $1.\overline{10}$ or 1.1011011101111 . . . ?
6. Graph sets of real numbers and describe sets of real numbers represented by given graphs.	Lecture and illustration Chalkboard Directed activity	6. Describe in words the set of real numbers represented by this graph.  Graph the set of all real numbers x, for which $x < 3$. 
7. Graph solution sets over the set of real numbers of compound sentences involving "or" and "and".	Lecture and illustration Chalkboard Directed activity	7. Graph the solution set of each of the following over R. a. $z = 5$ or $z = {}^{-}5$ b. $y \geq {}^{-}2$ or $y \geq 0$ c. $x < 5$ and $x \geq 1$ d. $x \geq 4$ and $x < 5$

Course or Grade: Eighth High

Concept: Graphing a Sentence in Two Variables

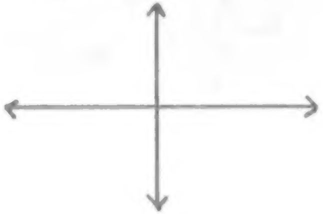
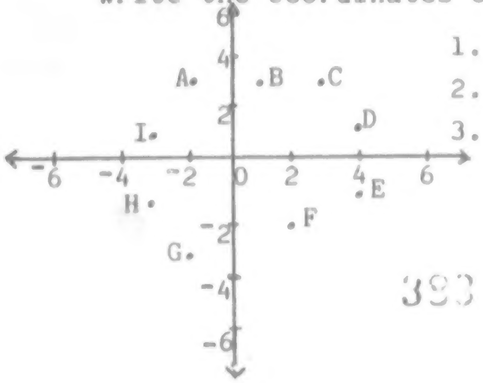
Objective: At the conclusion of this unit, students will demonstrate a knowledge of graphing a sentence in two variables. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Determine whether or not a given ordered pair is a solution of a specified open sentence.	Lecture and illustration Chalkboard Directed activity	1. Which of these ordered pairs: $(^-1,2)$, $(1,3)$, $(4,1)$, $(2,^-3)$, $(0,0)$, is a solution of the given open sentences? There may be more than one answer for each open sentence. a. $x + y = 4$ b. $x - y > 1$ c. $x^2 + y^2 < 1$
2. Find a set of solutions of an equation in two variables, x and y, by first finding an equivalent equation that expresses y in terms of x and then substituting a specified set of values for x.	Lecture and illustration Chalkboard Directed activity	2. Using $\{^-2, ^-1, 0, 1, 2\}$ as the replacement set for x, find the solution set of each open sentence. a. $2x + y = 0$ b. $-x + 2y = 4$ c. $3x + 2y = 1$
3. Find the solution set of an inequality in two variables over their given replacement sets.	Lecture and illustration Chalkboard Directed activity	3. Using $\{^-2, 0, 2\}$ as the replacement set for both x and y, find the solution set of each inequality. a. $x + y < 0$ b. $2x + 3y \geq {^-2}$

Course or Grade: Eighth High

Concept: Graphing A Sentence in Two Variables

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Sketch a rectangular coordinate system and graph a set of ordered pairs of real numbers.	Lecture and illustration Chalkboard Directed activity	4. Sketch a rectangular coordinate system and graph the following ordered pairs. a. (1,3) b. (2,¯4) c. (¯3,¯2)
5. Label the quadrants in a rectangular coordinate system, and state the coordinates of points in a coordinate plane.	Lecture and illustration Chalkboard Directed activity	5. a. Label the quadrants in the rectangular coordinate system.  b. Using the graph below, write the coordinates of:  6 4 2 ¯2 -4 -6 ¯6 -4 ¯2 0 2 4 6 A. .B .C .D I. .E H. .F G. 1. A 2. D 3. H

Course or Grade: Eighth High

Concept: Graphing a Sentence in Two Variables

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
6. Translate a function rule into an equation.	Lecture and illustration Chalkboard Directed activity	6. Write the function rule "Add 7 to x" as an equation in x and y.
7. State whether or not a given set of ordered pairs is a function.	Lecture and illustration Chalkboard Directed activity	7. Give the solution set of each sentence over $\{^-1, 1, 2\}$ and state if it is a function or is not a function: a. $x + y = 0$ b. $2x + y > 2$
8. Draw the graph of a linear equation in two variables.	Lecture and illustration Chalkboard Directed activity	8. Graph each equation on a coordinate plane. a. $x + y = 0$ b. $2x + 3y = 6$
9. Graph a linear inequality in two variables.	Lecture and illustration Chalkboard Directed activity	9. Graph each inequality: a. $2x - y \geq 0$ b. $3x + 2y < 6$
10. Use graphs in finding the solution set of a system of two linear equations in two variables.	Lecture and illustration Chalkboard Directed activity	10. Find the solution set of the system by graphing: a. $x + y = 6$ b. $x - y = 0$

Course or Grade: Eighth High

Concept: Probability and Statistics

Objective: At the conclusion of this unit, students will demonstrate a knowledge of probability and statistics. Students will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. State the probability of an event in an experiment with n equally likely outcomes.	Lecture and illustration Chalkboard Directed activity	1. A box contains 7 red, 4 green, 5 white, 6 black, and 3 blue marbles. Use this information to answer the following questions: a. What is the probability that a marble selected at random will be white? b. What is the probability that a marble selected at random will be either green or black?
2. Give the odds in favor of an event containing n equally likely outcomes.	Lecture and illustration Chalkboard Directed activity	2. A box contains 7 red, 4 green, 5 white, 6 black, and 3 blue marbles. Use this information to answer the following questions: a. What are the odds favoring the random selection of a marble that is either white or black? b. What are the odds against selecting a red marble?

Course or Grade: Eighth High

Concept: Probability and Statistics

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
3. Give the probability that the union of two nutually exclusive events will occur in one trial of an experiment.	Lecture and illustration Chalkboard Directed activity	3. What is the probability that a number selected at random from $\{3,4,5,6,7,8,9,10,11\}$ will be: a. even or 7? b. less than 5 or greater than 8?
4. Find the probability that the union of two given events will occur in one trial of an experiment.	Lecture and illustration Chalkboard Directed activity	4. Given the set, $A = \{2,3,4,5,6,7,8,9,10,11,12\}$: a. What is the probability that a number selected at random from A will be odd or greater than 6?
5. Find the mean, median, and all modes of a given set of data.	Lecture and illustration Chalkboard Directed activity	5. The scores on Mr. Miller's last math test were: 86, 59, 74, 93, 76, 62, 88, 81, 76, 61, 95, 69, 76, 64, and 70. a. What is the median? b. What is the mean? c. Find the mode(s).
6. Estimate the probability of an event on the basis of results obtained from related observations.	Lecture and illustration Chalkboard Directed activity	6. The football team has won 56 games and lost 24. What is the probability they will not win their next game?

Course or Grade: Eighth Average and Low and High

Concept: Metric system

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
5. Memorize information about the metric temperature scale.	Lecture and illustration Chalkboard Study sheets	5. Give the following information about the metric temperature scale: a. name b. freezing point c. boiling point d. normal body temperature
6. Use symbols and words interchangeably.	Lecture and illustration Chalkboard Study sheets	6. Match the following symbols and words: a. ____ millimeter b. ____ kilogram c. ____ dekaliter d. ____ square centimeter e. ____ cubic decimeter f. ____ kilometer g. ____ gram 1. g 4. mm 7. dal 2. cm^2 5. dm^3 3. km 6. kg

Course or Grade: Eighth Average and Low and High

Concept: Metric system

Objective: ________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
7. Know the approximations (in terms of our present system) of the most commonly used metric units.	Lecture and illustration Chalkboard Worksheets	7. Give the approximations in terms of our present system: a. 1 centimeter ≈ ________ b. 1 kilometer ≈ ________ c. 1 kilogram ≈ ________ d. 1 liter ≈ ________ e. 1 meter ≈ ________
8. Recognize different units which could be used to measure land area, depending upon the size.	Lecture and illustration Chalkboard Worksheets	8. Answer the following questions about land area: a. What unit will be most common in measuring land area, and will replace the "acre"? b. 1 hectare ≈ ______ acres c. 1 hectare = ______ ares d. If this drawing represents 1 are, what are its dimensions, in meters?

Course or Grade: Eighth Average and Low and High

Concept: Metric system

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
8. Continued		8. Continued If this drawing represents one hectare, what are its dimensions, in meters?
9. Know that all metric units are interrelated, and be able to go from a unit of capacity to a unit of volume (based on lengths) to a unit of weight.	Lecture and illustration Chalkboard Worksheets Balance scales Liter containers, etc. Cubic decimeter containers Meter sticks Centimeter tape measures	9. Fill in the blanks with the best answer: a. 1 liter = 1 ______ ______ b. 1 liter of chemically pure water at 4° C will weigh 1 ________. c. 1 milliliter = 1 ______ ________ d. 1 cm^3 of chemically pure water at 4^{o}C will weigh 1 ________.

Course or Grade: Eighth Average and Low and High

Concept: Metric System

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
10. Estimate the length in centimeters of line segments drawn on a sheet of paper.	Students are to use a metric ruler first to get the basic idea of different lengths (mm, cm, dm) Then the rulers are taken away Study sheets	10. Estimate to the nearest whole centimeter the length of each line segment. a. ____________________ b. __________ c. _______________ d. ____
11. Convert from one unit in the metric system to other units in the metric system.	Lecture and illustration Chalkboard Teacher-made worksheets Timed games	11. Fill in the blanks: a. 1 mm = ____ cm = ____dm b. 40 km = ____ hm = ____m c. 2 cl = ____ ml = ____l d. 6.6 g = ____dal = ____dg e. 146 l = ____dm^3 f. 17ml = ____dm^3 g. 20dm^3 = ____ml h. 13cm^3 = ____dl

Course or Grade: Eighth Average and Low and High

Concept: Metric System

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
12. Add metric quantities which have the same base unit.	Lecture and illustrations Chalkboard Teacher-made worksheets Cross-number puzzles Timed games	12. Add the following: a. 3 m + 12.8 m = ____m b. 17 g + 150dg = ____cg c. .078dal + 3.98 l = _____dl d. 356 mg + 39.8 cg = _____mg
13. Subtract metric quantities, which have the same base unit.	Lecture and illustration Chalkboard Teacher-made worksheets Cross-number puzzles Timed games	13. Subtract the following: a. 8.3 l - 2.5 dl = ____dl b. 7 m - 198 cm = _____dm c. 798 mg - 3.09 dg = _____cg
14. Convert from square centimeters to square decimeters, and vice versa.	Lecture and illustration Chalkboard Teacher-made worksheets	14. Fill in the blanks: a. 100cm^2 = _____dm^2 b. 750cm^2 = _____dm^2 c. 2 dm^2 = _____cm^2 d. 5.25dm^2 = _____cm^2

Course or Grade: Eighth Average and Low and High

Concept: Metric system

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
15. Convert from cubic centimeters to cubic decimeters, and vice versa.	Lecture and illustration Chalkboard Teacher-made worksheets	15. Fill in the blanks: a. 2 dm^3 = _____ cm^3 b. 7000 cm^3 = _____ dm^3 c. 3500 cm^3 = _____ dm^3
16. Convert from cubic decimeters to units of capacity (l, ml, etc.) and vice versa.	Lecture and illustration Chalkboard Teacher-made worksheets	16. Fill in the blanks: a. 25 l = _____ dm^3 b. 7.5 cm^3 = _____ l c. 2 dal = _____ dm^3 d. 17 dm^3 = _____ ml

GOALS OF MATH. I

Students in Math. I will:

1. Review and practice the basic computation operations of addition, subtraction, multiplication, and division of whole numbers, fractions and decimals and solve practical problems using the same.
2. Develop the ability to work with and understand percents.
3. Get an introduction and review of the metric system as well as basic probability and statistics.
4. Work with perimeters, areas, volumes, and the Pythagorean theorem.
5. Learn to solve simple algebraic equations.

Math. I evaluation:

1. Grades from daily homework assignments.
2. Unit tests.
3. Quizzes over day-to-day concepts.
4. Chapter tests.
5. Nine week tests.
6. Semester tests.
7. Standardized achievement test.

Course or Grade: Math. I

Concept: Whole Numbers

Objective: At the conclusion of this unit, students will demonstrate a knowledge of whole numbers. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Add and subtract whole numbers	Lecturing, questioning, discussion, chalkboard, textbook, and/or overhead.	1. Add or subtract as indicated: a. 218 47 +862 b. 2043 - 485
2. Compute following order of operations.		2. Simplify: 18 - (8 - 4)
3. Solve addition and subtraction equations.		3. Solve: $x + 26 = 94$
4. Use addition and subtraction in a practical situation.		4. Given that Lee Park's gross income is $6,000, Federal tax is $140, Social Security tax is $351, and his decrease in buying power is $551, how much is his real buying power?
5. Multiply by multiples of 10, 100, and 1000.		5. Multiply without using pencil and paper: a. 30 x 1000 b. 200 x 60
6. Multiply by one, two, and three digit multipliers.		6. Multiply: a. 27 x 6 b. 36 x24 c. 653 x274
7. Simplify expressions involving addition, subtraction, and multiplication following the order of operations.		7. Simplify: a. 6(9) + 8(7) b. 25 - 6(1 + 2)

Course or Grade: Math. I

Concept: Whole Numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
8. Solve a practical situation problem.		8. One metric ton of corn yields 28 cases of processed corn. 180 metric tons will yield how many cases?
9. Divide by one, two, and three digit divisors as well as with zeros in the quotient.		9. Divide: (Give remainders if they exist.) a. $5\overline{)436}$ b. $38\overline{)955}$ c. $379\overline{)865}$ d. $8\overline{)4831}$
10. Calculate following the proper order of operations.		10. Work out the answer: $\frac{2(5 + 1)}{3} + \frac{30}{5(2)}$
11. Solve multiplication and division equations.		11. Solve: a. $4n = 340$ b. $\frac{x}{12} = 50$
12. Solve a practical problem.		12. If 3 cans cost 82¢, how much will you be charged for just 1 can?

Course or Grade: Math. I

Concept: Decimals and the Metric System

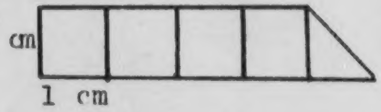
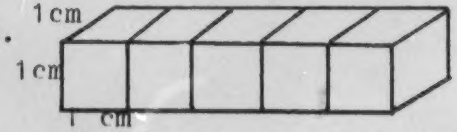
Objective: At the conclusion of this unit, students will demonstrate a knowledge of decimals and the metric system. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Write equivalent decimals.		1. Write an equal decimal for .6 in thousandths.
2. Compare decimals using >, <, or =.		2. Compare .7 and .701.
3. Add and subtract decimals.		3. Add or subtract as indicated; a. 5.4 + 24.7 + 3.5 b. 15.6 − 9.37
4. Solve practical decimal problems involving addition or subtraction.		4. If the sale price of a regular $28.95 blender is $16.40, how much would Marie save by buying it on sale?
5. Multiply decimals.		5. 3.9 x .64
6. Divide a decimal by a whole number	TC85 Division of Decimals #1	6. Divide: 23) 1.633
7. Multiply and divide a decimal by 10, 100, or 1000.		7. Find the answer without using pencil and paper: a. 100 x 3.615 b. 1000 x 4.7 c. 9.2 ÷ 100
8. Divide decimals.		8. Divide: a. .8) 41.84 b. 4.8 ÷ .32

Course or Grade: Math. I

Concept: Decimals and the Metric System

Objective: ____________________

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
9. Round decimals.		9. Round the quotient to the nearest hundredth: $4.3\overline{)\,1.65}$
10. Solve multiplication or division practical problems.		10. What is the total cost of 1.4 kg of chicken priced at $1.25 per kg?
11. Estimate and measure the length of a segment to the nearest centimeter or millimeter	FS/K66 The Metric System FS/K71-79 The Metric System: Measuring.	11. Estimate and then measure the length of this bar in centimeters. ______________
12. Do some conversions within the metric system on units of length.		12. 3.9 m = ? cm
13. Find areas of figures and do conversions within metric units of area.		13.  a. Count squares to find the above area in square centimeters. b. Give the area of the above figure in square millimeters.
14. Find volumes of figures and do conversions within metric units of volume.		14.  a. Count cubes to find the volume of this figure in cubic centimeters. b. Give the volume of the above figure in cubic millimeters.

Course or Grade: Math. I

Concept: Decimals and the Metric System

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
15. Choose appropriate units of capacity, mass, and temperature.		15. Circle the more sensible measure in each case: a. The amount of oil in a quart. 1 ml, 1 l b. The mass of a loaf of bread. 454 mg, 454 g, 454 kg c. Temperature for ice skaing. -3°C, 20°C
16. Relate volume, capacity, and mass.		16. Complete this statement: 23 cm^3 of water is ____ml of water and has a mass of ____g.
17. Solve practical metric problem.		17. What is the cost of 1.5 meters of material at $3.50 per meter?

Course or Grade: Math. I

Concept: Fractions, Mixed Numbers, and Probability

Objective: At the conclusion of this unit, students will demonstrate a knowledge of fractions, mixed numbers, and probability. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Rename fractions and mixed numbers.		1. a. Reduce 8/20. b. Write 17/2 as a mixed number. c. Write 6 3/4 as a fraction.
2. Write a fraction as a decimal		2. Write 2/5 as a decimal.
3. Multiply fractions.		3. Find: $\frac{3}{4} \times \frac{8}{9}$
4. Multiply mixed numbers.		4. Give answer as a mixed number: $1\frac{1}{4} \times 5\frac{1}{10}$
5. Divide fractions and mixed numbers.		5. Find: a. $\frac{3}{4} \div \frac{5}{8}$ b. $3\frac{1}{2} \div 2$ 3/4
6. Solve practical fraction problems involving multiplication or division.		6. The bolt of a "C" clamp moves 1/20 inch in one turn. How far will it move in $7\frac{1}{2}$ turns?
7. Find common denominators.		7. Write 1/2, 1/3, and 1/4 as fractions with a common denominator.
8. Compare fractions and mixed numbers.		8. Compare using >, <, or =. a. 5/8 and 3/4 b. 2 8/16 and 2 1/2
9. Add fractions.		9. Add: 1/2 + 2/3 + 1/6

Course or Grade: Math. I

Concept: Fractions, Mixed Numbers, and Probability

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
10. Subtract fractions.		10. Subtract: 3/4 - 2/3
11. Add and subtract mixed numbers.		11. Find: a. 7 2/3 + 4 1/3 b. 7 1/5 - 2 3/4
12. Solve practical problems involving addition or subtraction of fractions or mixed numbers.		12. How many seconds did Jenny use to drill all three braces? 1st brace, 19 1/5 seconds 2nd brace, 18 9/10 seconds 3rd brace, 18 1/2 seconds
13. Give the probability of an event and show a tree diagram.		13. a. Give the probability that the roll of a die will show two or four. b. Make a tree diagram to find the number of outcomes for tossing two coins.
14. Find probabilities involving independent events using multiplication.		14. Multiply to find the number of possible outcomes for choosing a four-digit code number if each digit is chosen at random.
15. Find probabilities involving dependent events.		15. $\boxed{T}$ $\boxed{A}$ $\boxed{L}$ $\boxed{L}$ $\boxed{Y}$ Give the probability of drawing two cards at random that show L if the first card is not replaced before making the second draw.

Course or Grade: Math. I

Concept: Fractions, Mixed Numbers, and Probability

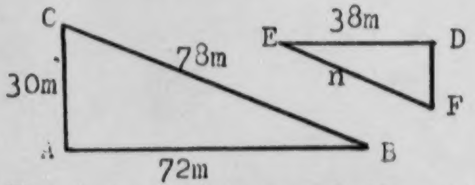
Objective:

<table>
<tr><th>LEARNER OUTCOMES</th><th>MATERIALS/METHODS</th><th>EVALUATION</th></tr>
<tr><td>16. Use experiments to make predictions.</td><td></td><td>16. Tack Toss:
<table>
<tr><th>Outcome</th><th>Tally</th></tr>
<tr><td>Point Up</td><td>~~////~~ ~~////~~
~~////~~ ///</td></tr>
<tr><td>Point Down</td><td>~~////~~ /</td></tr>
</table>
Using the above, predict the probability that, on the next toss, the tack would land point up.</td></tr>
<tr><td>17. Solve practical probability problems.</td><td></td><td>17. How many license plates are possible that show 2 letters followed by 3 digits?</td></tr>
</table>

Course or Grade: Math. I

Concept: Ratio, Percent, and Statistics

Objective: At the conclusion of this unit, students will demonstrate a knowledge of ratio, percent, and statistics. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Write ratios.		1. Write the ratio of 3 records for $14.
2. Solve proportions.		2. Find the missing number in this proportion $\frac{4}{10} = \frac{22}{n}$
3. Give corresponding angles and sides of similar triangles.		3.  The triangles are similar. Give 3 pairs of corresponding angles and 3 pairs of corresponding sides.
4. Find missing sides in similar triangles.		4. Write a proportion and find n in the above triangles.
5. Solve problems involving ratio, proportion, or similarity.		5. If it takes 4 hours to drive 314 kilometers, how long does it take to drive 785 kilometers?
6. Write percents as decimals and decimals as percents.	TC79 Understanding Percent TC81 Changing Percent to Decimals TC84 Changing Decimals to Percents	6. a. Write 4.6% as a decimal. b. Write .08 as a percent.

Course or Grade: Math. I

Concept: Ratio, Percent, and Statistics

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
7. Write percents as fractions and fractions as percents.	TC80 Changing fractions to Percent TC82 Changing Percent to Fractions	7. a. Write 20% as a fraction in lowest terms. b. Write 3/4 as a percent.
8. Find a percent of a number.		8. Find 15% of 93.
9. Find what percent one number is of another.		9. 15 is what percent of 25?
10. Find a number when a percent is known.		10. 6 is 30% of what number?
11. Solve practical problems involving percent.		11. David Glenn wanted to buy tires priced at $250. He borrowed the money for 6 months at an interest rate of 1.5% per month. How much interest did he pay?
12. Find the mean, mode, and median for a set of data.		12. Find the mean, mode, and median for the following: 172 168 163 180 172 178 160 154 167 172 165
13. Read and make bar, line, and circle graphs.		13. Make a bar, line, and circle graph: Fabric Blend Polyester 50% Acrylic 40% Nylon 10%

Course or Grade: Math. I

Concept: Algebra

Objective: At the conclusion of this unit, students will demonstrate a knowledge of some of the basics of algebra. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Write and order positive and negative numbers.		1. Arrange these numbers in order from least to greatest: 3, 6, -1, 0
2. Add and subtract positive and negative numbers.		2. Do the following: a. -6 + 2 + -5 + 1 b. 12 - (6 - -3)
3. Multiply and divide positive and negative numbers.		3. Compute: a. 5(3) - 6(-2) b. $\frac{7 - 12}{-5}$
4. Evaluate expressions.		4. Evaluate: a. -4sw when s = 15 and w = -1 b. 5xy + -1 when x = 3 and y = 2
5. Solve addition and subtraction equations.		5. Solve: a. .83 + r = 5.7 b. a - .16 = .35
6. Solve multiplication and division equations.		6. Solve: a. -6c = 420 b. $\frac{x}{-4} = -32$
7. Solve two step equations.		7. Solve: a. 3y + 8 = 53 b. $\frac{m}{7} - 1 = 8$
8. Combine like terms to solve equations.		8. Solve: a. 4n + 3n = 63 b. 12 + 3c - 7 = 68

Course or Grade: Math. I

Concept: Algebra

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
9. Locate points on a grid by graphing their ordered pairs.		9. a. Plot and label the point R(6,2) on a grid. b. Plot and label the point T(-2,-1) on a grid.
10. Draw the graph of a linear equation on a four-quadrant grid.		10. Set up an x-y chart and graph the equation $y = x + 2$

Course or Grade: Math. I

Concept: Geometry and Right-Triangle Relations

Objective: At the conclusion of this unit, students will demonstrate a knowledge of some basic geometry and right-triangle relations. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find the perimeter of a geometric figure.		1. Give the perimeter of a rectangle having a length of 17 cm and a width of 8 cm.
2. Find the circumference of circles using the formulas $C = \pi d$ and $C = 2\pi r$.		2. Find the circumference: a. Of a circle with diameter of 16.8 m b. Of a circle with radius of 9 m
3. Find the areas of rectangles, squares, parallelograms, triangles, trapezoids, and circles.		3. Find the areas of: a. A rectangle with dimensions 11.2 cm and 3.2 cm b. A square with side 4.8 mm c. A parallelogram with base 7.5 m and altitude 2.4 m d. A triangle with base 30 cm and altitude 10 cm e. A trapezoid with bases of 14 cm and 7cm and altitude of 5.6 cm f. A circle with radius of 6 m
4. Solve practical problems involving perimeter or area.		4. Plush carpeting costs $9.99 per square meter. Find the cost of carpeting a living room with these dimensions: length, 6m; width, 4m.
5. Find the surface areas of a rectangular prism, cube, and of a cylinder.		5. Find the surface areas of: a. A rectangular prism with dimensions of 15cm x 10cm x 5cm b. A cube with edge 28mm c. A cylinder with radius 10m and altitude 22m.

Course or Grade: Math. I

Concept: Geometry and Right-Triangle Relations

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
6. Find the volumes of a rectangular prism and cube, a cylinder, pyramid, cone, and sphere.		6. Find the volumes of: a. A rectangular prism with dimensions 3m x 1.2m x 1.2m b. A cube with edge 9.1m c. A cylinder with radius 5cm and altitude 4cm d. A pyramid with rectangular base 12m and altitude 8m e. A cone with radius 9cm and altitude 14cm f. A sphere with radius 15m
7. Solve practical problems involving volume or area.		7. How many cubic meters of concrete are needed to pour a rectangular patio that measures 5 meters by 8 meters and is 0.2 meter deep?
8. Find powers of numbers by using positive exponents and find square roots of numbers by trial and error.		8. Find: a. 5^3 b. $\sqrt{64}$
9. Give squares and square roots of numbers by reading a table.		9. Give (by using table): a. 35^2 b. $\sqrt{7921}$
10. Use the Pythagorean Theorem and a table of squares and square roots to find the missing lengths of a right triangle.		10. Use the Pythagorean Theorem and a table to find: a. The hypotenuse of a right triangle with sides of 6cm and 5cm. b. The side of a right triangle with hypotenuse 50m and side 48m.

GOALS OF MATH. II

Students in Math. II will:

1. Review the basic operations of addition, subtraction, multiplication and division using whole numbers, fractions, decimals and negative numbers.
2. Be able to apply area and volume formulas to actual situations.
3. Use the number line in solving problems and use the coordinate system to graph lines.

MATH. II EVALUATION

1. Daily Homework assignments.
2. Unit tests.
3. Quizzes over day-to-day achievements.
4. Chapter tests.
5. Nine-weeks tests.
6. Semester tests.

Course or Grade: Math. II

Concept: Set Theory

Objective: At the conclusion of the first section in set theory, students will demonstrate a knowledge of sets of numbers. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Relate the definition of a set as a definite collection of objects and its relations.	Bulletin Board on Matching Symbols	1. Write in set notation this collection of letters: A,B,C,F,K.
2. State which objects belong to a set and which do not. Know that the objects in a set are called elements or members of the set and the relation.	Use the notation of $\in$ and $\notin$	2. Given the set $A = \{1,2,3,4,5\}$ Replace each ? with $\in$ or $\notin$. a. 3 ? A, b. 9 ? A, c. 4 ? A.
3. Describe sets either by roster or rule.		3. Given the set $\{a,b,c,d\}$. Describe it by rule.
4. State that the empty set is a subset of every set.	Use the $\subset$ and $\not\subset$.	4. Which set is a subset of every set? a. $\{x,y,z\}$ b. $\emptyset$ c. $\in$ d. $\{\text{numbers}\}$
5. Demonstrate the use of the symbols $\emptyset$ or $\{\}$.		5. Choose the symbols for null set. a. $\in$ b. $\notin$ c $\emptyset$ d. $\{\}$ e $\{\emptyset\}$

Course or Grade: Math. II

Concept: Set Theory

Objective: At the conclusion of the second section in set theory, students will demonstrate a knowledge of comparison of sets of numbers. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. State the definition of one-to-one correspondence.		1. Which sets are in one-to-one correspondence? a. {1,2,3}, {c,d,f} b. {6,3,9,8}, {4,a,*,?}
2. State sets of numbers and relate them to one another. 1) integers, 2) natural numbers, 3) whole numbers, 4) counting and natural numbers.	{integers}, {natural numbers}, {whole numbers}, {counting numbers}, {real numbers}	2. Match. a. Integers — 1. {all numbers} b. Natural or counting numbers — 2. {...,-3,-2,-1, 0,1,2,3,...} c. Whole numbers — 3. {0,1,2,3,4,...} d. Real numbers — 4. {1,2,3,4,...}
3. Recognize what is meant by finite or infinite.		3. Which sets are finite and which are infinite? a. R b. {2,4,6,8} c. {natural numbers}

Course or Grade: Math. II

Concept: Set Theory

Objective: At the conclusion of the third section in set theory, students will demonstrate a knowedge of the difference between functions and relations. They will be able to:

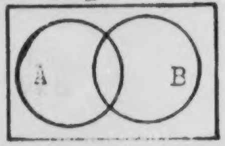
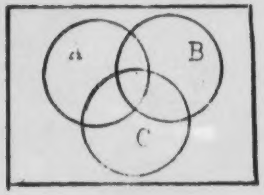
LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Recognize what an ordered pair is, its first and second components.	Bulletin Board showing ordered pairs, domain, and range. Graphing pictures Plotting points	1. a. Name the first coordinate of the given ordered pairs. (3,4), (4,6), (5,8) b. Name the second coordinate of the given ordered pairs. (3,4), (4,6), (5,8)
2. Recognize definition of domain and range.	Function Machine	2. Given: (3,4), (4,6), (5,8). a. State the domain. b. State the range.
3. Recognize and understand definitions of a function and a relation.		3. Are the following relations or functions?

a. x	y	b. x	y	c. x	y
3	4	0	6	0	6
0	1	3	6	1	3
2	3	2	6	2	3
7	6	5	6	9	6
6	3				

Course or Grade: Math. II

Concept: Set Theory

Objective: At the conclusion of the fourth section in set theory, students will demonstrate the use of union and intersection. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Demonstrate the intersection and union of sets and the symbols to indicate each.	Symbols for union and intersection. Venn diagrams showing the universe, union, and intersection, complements of sets.	1. Given the sets: K = A,B,C,D,E M = E,F,G,H state: a. K intersection M b. K union M
2. Exhibit the use of Venn (Euler) diagrams, combination of union, intersection, and complements	Little transparencies.	2. Using Venn diagrams show the following. a.  A U B b.  (A U B)$\cap\overline{C}$

Course or Grade: Math. II

Concept: Computation with Whole Numbers

Objective: At the conclusion of the first unit on computation with whole numbers, students will deomonstrate the use of basic operations. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Recognize that addition, subtraction, multiplication, and division are all binary operations and that each problem has its unique answer.	sum = addend + addend sum - addend = addend	1. Solve. a. $3 + 6 = ?$ b. $6 - 3 = ?$ c. $6 \cdot 3 = ?$ d. $6 \div 3 = ?$
2. Demonstrate that division by zero is undefined.	Use common sense to determine the number of zeros in 7. Are there 5? 500?	2. How many zeros are in 10? a. 50; b. 10; c. 0; d. undefined
3. Relate to real numbers and defined sets a. Law of Closure for addition, subtraction, multiplication, division. b. Commutative Property for addition, subtraction, multiplication, division. c. Associative Property for addition, subtraction, multiplication, division.	Comparison of known facts and relating to unknown equations.	3. Match a. (3 6) is a real b. $3(2 \cdot 4) = (3 \cdot 2)4$ c. $3(a + 2) = 3a + 6$ d. $4 \cdot 2 = 2 \cdot 4$ e. $4 + 2 = 2 + 4$ __1. Commutative Property of Addition __2. Associative Property of Multiplication __3. Closure for Addition __4. Commutative Proper of Multiplication __5. Distributive Property
4. Demonstrate the comparison property.	Comparison with common every day known facts of weights, heights, lengths, distance numbers.	4. Replace the ? with , , or =. a. $a = 4$; $b = 6$; $a ? b$ b. $a = 5$; $b = 4 + 1$; $a ? b$ c. $a = 10$, $b = 2(3+2)$; $a ? b$ d. $x = 7$; $y = 11 - 8$; $x ? y$ e. $x = \frac{14 + 2}{2}$; $y = -1$; $x ? y$

Course or Grade: Math. II

Concept: Computation with Whole Numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
5. Apply the following properties of zero: $a + 0 = a$; $a \cdot 0 = 0$; $a - 0 = a$; $0 \cdot a = 0$; $\frac{a}{0}$ is undefined.	Use examples.	5. Solve: a. $b + 0 =$ b. $b - 0 =$ c. $0 \cdot a =$ d. $\frac{7}{0} =$
6. Apply the properties of one Multiplication property of 1: $x \cdot 1 = x$; Division property of 1: $\frac{x}{1} = x$ and $\frac{a}{a} = 1$	Common sense reasoning and well understood examples and facts.	6. Solve the following: a. $a \div 1 =$ b. $7 \div (4-3) =$ c. $6 \div 1 =$ d. $b \div b =$

Course or Grade: Math. II

Concept: Computation with Whole Numbers

Objective: At the conclusion of the second unit on computation with whole numbers, students will demonstrate a knowledge of the use of basic terminology. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1 Recognize the effect of multiplying by 1 and adding 0 using the additive identity $(a + 0 = a)$ and the multiplicative identity, $(a \cdot 1 = a)$	Use the terms additive identity and multiplicative identity in class. Listen for verbal use of these terms when describing certain numbers.	1. Solve. a. $x + 0 =$ b. $x \cdot 1 =$ c. $0 + y =$ d. $1 \cdot y =$
2. Relate the following terms with their meanings in number sentences: variables, expression, equation, inequality.	Visual aids and overhead transparencies of lots of examples. Variable-changing, unknown Expression-not complete part of statement Equation-complete, with an equal sign Inequality- with less than or greater than sign comparison	2. Match a. x ___equation b. $3 + x = 5$ ___inequality c. $3x$ ___expression d. $3 + x > 5$ ___variable
3. Relate an operation with its inverse.	Verbal recognition and explanations.	3. State the inverse of division, multiplication, addition, subtraction.
4. Exhibit the knowledge of sum, addends; difference; product, factor; quotient, divisor, dividend	addend + addend = sum sum - addend = addend difference factor x factor = product product dividend ÷ divisor = quotient Overhead transparency with colored overlays	4. Replace each empty blank with the correct name of the number. ____ + addend = _____ Dividend _____ = ____ ____ x _____ = Product sum - addend = ____

Course or Grade: Math. II

Concept: Computation with Whole Numbers

Objective: At the conclusion of the third unit on computation with whole numbers students will demonstrate the ability to simplify expressions. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Exhibit working: 1) the innermost grouping first and to work outward; 2) when groupings are eliminated work the multiplication and division; 3) when all multiplication and division have been performed, the addition and subtraction are to be conducted; 4) operations of equal "rank" are performed from left to right. 447	Examples on board describing each step 1-4. Constant question and answer sessions. Game: "Indianapolis 500" Polyhedra Dice Game #26	Simplify. a. $(3 + 2) + (3 + 3)$ b. $3(6 + 2) + \frac{(4 + 2)}{3}$ c. $3(6 + 2)$ d. $6 + 3 - 4$ 448

Course or Grade: Math. II

Concept: Systems of Numeration

Objective: At the conclusion of the unit on systems of numeration, students will demonstrate a general use of exponents and bases. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Relate and demonstrate what a base and exponent are and how they are written.	Overhead color coded transparency showing exponent and base.	1. Given x^2. a. State the base. b. State the exponent. c. Write using exponent "seven to the fifth power."
2. Exhibit and expand an exponential expression.	Discuss the advantages of our base 10 place value number system over the ancient Egyptian and Roman numeral systems.	2. Expand: 5^3

Course or Grade: Math. II

Concept: Number theory

Objective: At the conclusion of the first unit of number theory students will relate terms and understand divisibility. They will be able to:

LEARNER OUTCOMES	**MATERIALS/METHODS**	**EVALUATION**
1. Remind and review: factor x factor = produc dividend divisor = quotient	Discuss and review students' knowledge of products and quotients.	
2. Relate the terms: partial, remainder, multiple (factors)	Transparency using well-known examples naming the parts: quotient, dividend, remainder, multiples.	2. Given the problem: $\begin{array}{r} 231 \\ 2\overline{)463} \\ \underline{4} \\ 6 \\ \underline{6} \\ 3 \\ \underline{2} \\ 1 \end{array}$ a. What is the dividend? b. what is the divisor? c. What is the quotient? d. What is the remainder?

Course or Grade: Math. II

Concept: Number Theory

Objective: At the conclusion of the second unit of number theory students will demonstrate a knowledge of factors and multiples. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Exhibit the understanding of: even and odd numbers; prime numbers; composite numbers.	Definition of composite and prime numbers. Factor trees.	1. State if the following are prime or composite numbers. If composite complete the factor tree and writ the factorization using exponents if possible. a. 72 b. 8 c. 12 d. 5 e. 9 f. 31

Course or Grade: Math. II

Concept: Number Theory

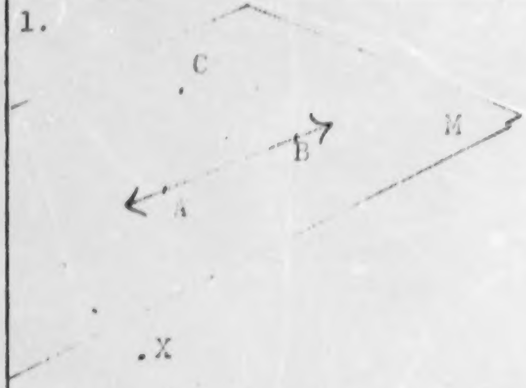
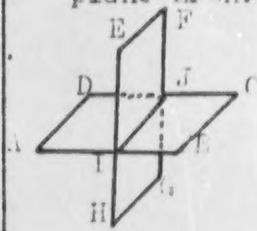
Objective: At the conclusion of the third section on number theory, students will demonstrate a general knowledge of greatest common factor and least common multiple. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Derive the greatest common factor and the least common multiple from a group of fractions and a set of numbers. 455	Discussion and question/answer sessions. Explanation of easy recognizable problems and relating them to unknowns, using exponential notation.	1. a State the gcf of the sets: {4,6} {4,8} {8,20} {6,14,21} b. State the lcm of the sets: {15,6,12} {7,14,49} {8,4,12} 456

Course or Grade: Math. II

Concept: Geometry

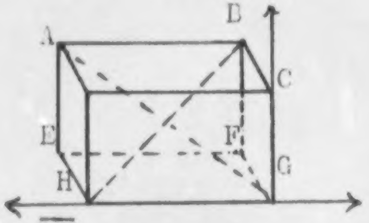
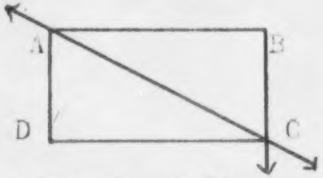
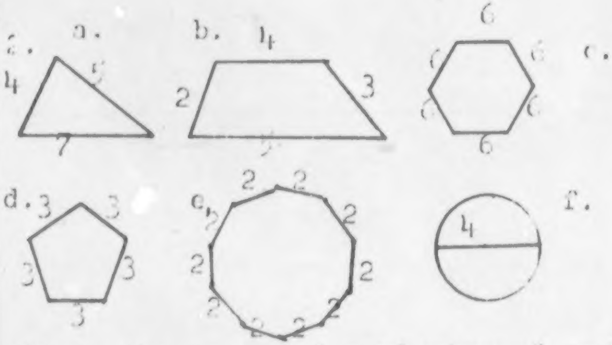
Objective: At the conclusion of the first section on geometry, the students will demonstrate a knowledge of figures in space. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Demonstrate with a representation what is meant by the terms: point, space, line, plane.	Discuss examples around us. Use self-made examples. A small sphere (point), a stick with arrows on each end (line), piece of cardboard (plane) can be suspended from the ceiling for visual representations.	1.  Given the figure above name a representation of the following: a. point b. space c. line d. plane
2. Apply the terms: collinear, coplanar, parallel lines, perpendicular lines, parallel planes, perpendicular planes and use the symbols for parallel and perpendicular.	Describe various common examples: a line on the floor where the tiles meet; parallel lines on the floor.	2. Plane ABCD is a right angles with plane EFGH.  True or False a. $\overleftrightarrow{EH} \underline{\perp} \overleftrightarrow{GH}$ b. plane ABCD $\underline{\perp}$ plane EFGH c. $\overleftrightarrow{IJ} \parallel \overleftrightarrow{EF}$ d. $\overleftrightarrow{IJ} \parallel \overleftrightarrow{AB}$ d. Name two lines that are coplanar. e. Name two points that are coplanar.

Course or Grade: Math. II

Concept: Geometry

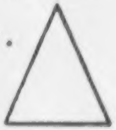
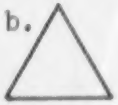
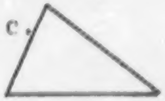
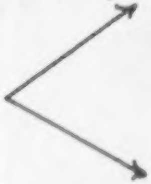
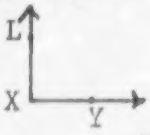
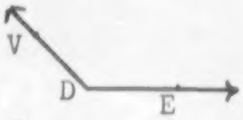
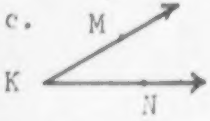
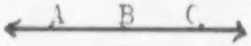
Objective: At the conclusion of the second section on geometry, students will demonstrate a knowledge of length and perimeters. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Define and symbolize: line segment, endpoints, line, polygon, vertex, diagonal, consecutive vertices, ray, consecutive sides, congruent segments.	Use symbols and terms to describe classroom figures. Given the figure below on a transparency, illustrate:  1. $\overline{AB}$ 2. endpoints of $\overline{AB}$ 3. $\overleftrightarrow{GH}$ 4. $\overrightarrow{GC}$ 5. polygon 6. rectangle ABCD 7. Vertex of angle CGH 8. diagonals $\overline{BH}$, $\overline{AG}$, $\overline{CE}$, $\overline{DF}$ 9. consecutive vertices	1  Identify the following and name. a. a ray b. a line c. a line segment d. a polygon e. a diagonal f. two congruent sides g. two consecutive vertices
2. Identify a given figure and give its perimeter: triangle, quadrilateral, pentagon, hexagon, decagon, circle.	Transparencies showing the various figures.	2.  a. 4 5 7 b. 4 2 3 5 6 6 6 6 6 6 c. d. 3 3 3 3 3 e. 2 2 2 2 2 2 2 2 2 2 4 f. State the name and perimeter of each of the above.

Course or Grade: Math. II

Concept: Geometry

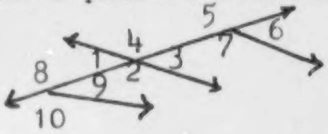
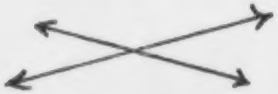
Objective: At the conclusion of this section of geometry, students will demonstrate a knowledge of triangles and angles. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Classify triangles according to their sides.	Draw scalene, isosceles, equilateral triangles.	1. Classify each triangle according to the measure of its sides. a.  b.  c. 
2. Describe an angle using terms: angle, exterior, interior, less than symbol, vertex.	Use a color coded overlay transparency showing an angle, its interior and exterior.	2. Given an angle as shown, label the following: a. interior b. exterior c. angle ABC d. vertex 
3. Classify angles according to measurement: straight, acute, obtuse, right.	Group Activity: 1. Draw straight angles and measure with protractor. 2. Draw acute angles and measure. 3. Draw obtuse angles and measure. 4. Draw right angles and measure.	3. Classify the following angles and state their measurement. a.  b.  c.  d. 
4. Perform measurements of angles using a protractor.	Worksheet measuring angles	

Course or Grade: Math. II

Concept: Geometry

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
5. Relate complementary angles, supplementary angles, vertical angles, consecutive angles of a polygon.	Oral exercises: Name the complements and supplements of given angles.	5. a. What is the complement of 30°? b. What is the supplement of 120°? c. Name a pair of vertical angles. 
6. Show vertical angles are congruent by measuring with a protractor.	Demonstrate and describe vertical angles.	6. Measure the pairs of vertical angles. 
7. Classify triangles as right, obtuse, acute according to their angles.	Group activity using a transparency draw several right triangles, obtuse triangles, acute triangles.	7. Classify each triangle according to angles. a. If the triangle has one angle equal to 90° it is a _____. b. If the measures of the angles are 50, 55, 75, it is ______. c. If the measures of the angles are 120, 35, 25 it is ______.

Course or Grade: Math. II

Concept: Geometry

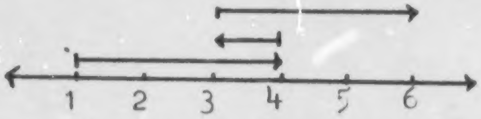
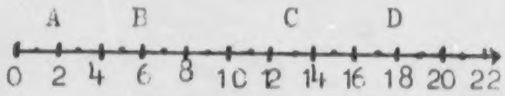
Objective: At the conclusion of this section on geometry, students will demonstrate a knowledge of plane regions, areas and area formulas. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Select and apply formulas to find the areas of rectangles, parallelograms, triangles, trapezoids, circles. (Know the value of pi)	Transparencies with many figures and area formulas. Using pre-cut figures so that students can feel, hold, move them, measure the figures to obtain the necessary information to find area.	1. "Musical Chairs Test" For each figure at each station answer the following. a. What is the name of this figure? b. What is the formula for the area of this figure? c. What are the variables in the formula? Make and state the necessary measurements. d. What is the area of the given figure?
2. Select and apply formulas to find volumes of rectangular prisms and cylinders.	"Musical Chairs Test"	

Course or Grade: Math. II

Concept: Coordinate System on a Line

Objective: At the conclusion of this section, students will demonstrate a knowledge of number lines. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Exhibit familiarity with the arrangement of the number line by graphing points and operations using displacement of vectors.	Provide each student with a transparency sheet with permanent number line and a water washable transparency pen to make graphs.	1. Graph the following equations on a number line. a. $8 + 3 - 6 = 5$ b. $11 - 3 = 8$ c. $2 \cdot 3 = 6$ d. $10 \div 5 = 2$
2. State the number sentence given the graph.		2. State the number sentence for: 
3. Demonstrate by identification and illustration a. coordinate system on a line b. graph of a number line c. coordinate of a point d. origin e. unit segment f. midpoint of a segment	Graph stamp.	3. Given the number line.  A B C D 0 2 4 6 8 10 12 14 16 18 20 22 a. Graph point E at 9. b. Graph point K at the origin. c. Give the coordinate of points A,B,C,D. d. What is the unit measure of segment AC? e. What is the midpoint of segment AC?

Course or Grade: Math. II

Concept: Fractions and Rational Numbers

Objective: At the conclusion of this section, students will demonstrate a knowledge of rational numbers. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Define a rational number.	A rational number is any number which can be expressed in the form a/b, where a is a whole number and b is a natural number.	1. a. What is a rational number? b. Is pi a rational number?
2. Use basic rules for operations with fractions.	Group exercises to find a common denominator; to multiply rational numbers (using cancellation shortcut for reducing fractions); to divide rational numbers.	2. a. What is the common denominator for 1/2, 3/5, and 7/30? b. 3/5 + 1/12 = c. 4/7 - 2/9 = d. (5/8)(4/25) = e. (5/8) ÷ (10/15) =
3. Compare rational numbers.	Use the number line.	3. Replace the ? with >, <, or =. a. 1/5 ? 1/6 b. 3/8 ? 4/7

Course or Grade: Math. II

Concept: Decimals and Rational Numbers

Objective: At the conclusion of the section, students will demonstrate a knowledge of decimal numbers. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Recognize the place value of the digit spaces and read them orally.	Place Value Board	1. Read the following orally. a. 4.506 b. .03 c. 10.039 d. 121.3639 e. 78.00006
2. Write decimal numbers in expanded form using exponents.	$358 = (3\cdot100) + (5\cdot10) + (81)$ $= (3\cdot10^2)+(5\cdot10^1)+(8\cdot10^0)$	2. Expand. a. 358 b. 2.5
3. Compare decimal numbers.		3. Arrange from smallest to largest. 3.2, 3.02, 132, 1.032
4. Write decimal numbers in words.		4. Write in words as you would read. a. 3.7 b. .083 c. 1.006
5. Perform: addition of decimals; subtraction of decimals; multiplication of decimals; division of decimals; rounding off.	Points to remember. 1. Keep decimals in line for addition and subtraction. 2. Total the places to the right of the decimal for multiplication. 3. Move the decimal to make the divisor a whole number.	5. a. 3.4 + 134 + .004 = b. 16.3 - .36 = c. 18.8 x .003 = d. 3 2.1 e. Round 15.826 to the nearest tenth. f. Round 15.4306 to the nearest thousandth.

Course or Grade: Math. II

Concept: Decimals and Rational Numbers

Objective: At the conclusion of this section, students will demonstrate a klowledge of conversion of decimals and fractions. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Convert decimal numbers to fractions and fractions to decimals.		1. a. Convert these decimals to fractional numbers: 3.3 1.006 b. Convert these fractions to decimal numbers. 3/5 8/9 c. Convert these decimal numbers to fractional numbers. $3.\overline{63}$ $4.\overline{2}$
2. Write repeating decimals with bar notation.		2. Simplify. a. 8.66666666... b. .333333333333....
3. Recognize that every rational number can be written and represented by a repeating decimal.		3. Can every rational number be written and represented by a repeating decimal?

Course or Grade: Math. II

Concept: Percentage and Statistics

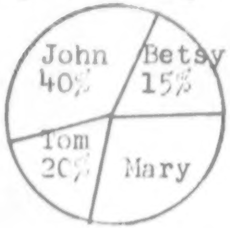
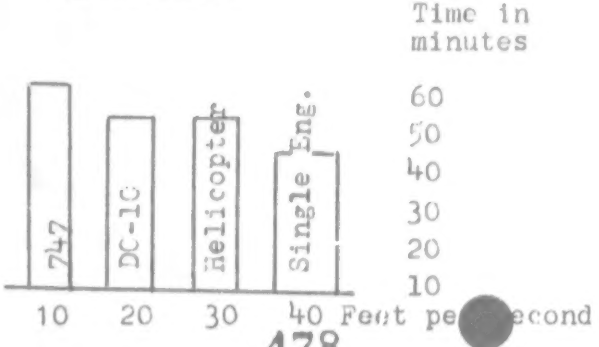
Objective: At the conclusion of this section, students will demonstrate a knowledge of percentage and statistics. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Define ratio and proportion.	$\frac{5}{8}$; 5:8; 5 to 8 $\frac{3}{5} = \frac{6}{10}$; 3:5 = 6:10; 3 to 5 = 6 to 10	1. a. What is a ratio? b. What is a proportion
2. Solve for an unknown in a proportion.	Cross multiply and divide. $\frac{3}{5} = \frac{x}{10}$	2. Solve. a. $\frac{5}{m} = \frac{8}{16}$ b. $\frac{x}{15} = \frac{3}{5}$
3. Represent percent as hundredths.	Percent means hundredths.	3. Write 3% as a fraction.
4. Express a) percentages as ratios; b) fractions as decimals and change to percents.		4. Express as a ratio. a. 83% b. one-fourth c. .2
5. Solve the three kinds of percentage problems using proportion.	Group activity: Collect newspaper articles that use percentages.	5. Solve. a. 52% of 150 is ___. b. 36% of ___ is 72. c. ___% of 60 is 15.
6. Solve business applications involving percentages.	Transparencies showing: loan applications, saving account information, finance charge attachments on credit cards, down payment requirement forms.	6. Mr. Hoff, at a local sporting-goods shop, gives team players a 20% discount on equipment. Mike paid only $18.80 for his new tennis racket. What was the marked selling price of the tennis racket?

Course or Grade: Math. II

Concept: Percentage and Statistics

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
7. Solve percentage problems using mark-up, mark-down, yearly interest, interest on unpaid balance, banking, simple and compound interest.	Students write individual newspaper articles, giving a certain discount and having a certain mark-up. Duplicate for other students.	7. a. Mr. Smith wanted to make a profit of 13% on the operation of his drive-in ice-cream stand. If his monthly costs average $1272, how much money must he take in to realize his goal? b. If the simple interest on $250 for 1 year, 8 months is $30, how much is the interest in $425.50 for 3 years, 7 months, 25 days?
8. Derive information from divided bar graphs, circle graphs, broken line graphs, pictographs.		8. Given the percent of ownership shown, how much of a certain company does Mary own? a.  b. How high will the DC-10 be in 53 minutes? 

Course or Grade: Math. II

Concept: The Complete Set of Integers

Objective: At the conclusion of this section, students will demonstrate a knowledge of integers and the number line. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Relate the set of negative integers to the number line.	Use a number line stamp. Use a number line transparency.	1. Label a given number line.
2. Draw a number line with positive and negative sides and label.		2. Place the following fractions on the number line and label them.
3. Simplify expressions involving the absolute value sign.		3. Simplify. a. $\lvert -7 \rvert$ b. $\lvert 8 \rvert$ c. $\lvert 8 + 3 \rvert$ d. $\lvert -1/3 \rvert$

Course or Grade: Math. II

Concept: Exponents and Scientific Notation

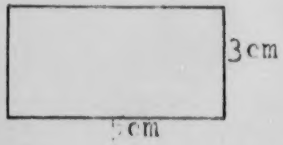
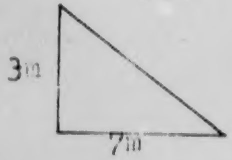
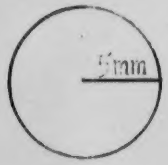
Objective: At the conclusion of this section, students will demonstrate a knowledge of exponents and scientific notation. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Demonstrate the rules of multiplication and division of like bases with positive and negative exponents.	Remember the "rule"--move to the largest exponent. Expand: $\frac{10^5}{10^4} = \frac{10 \cdot 10 \cdot 10 \cdot 10 \cdot 10}{10 \cdot 10 \cdot 10 \cdot 10}$ Reduce: $\frac{10^5}{10^4} = 10^{5-4} = 10$	1. Simplify. a. $3^2 \cdot 3^5 =$ b. $\frac{10^5}{10^4} =$ c. $\frac{6^3}{6^4} =$
2. Identify $x^0 = 1$		2. a. $5^0 =$ b. $y^0 =$
3. Represent numbers in scientific notation.	3.86 $3 \times 1 + 8 \times \frac{1}{10} + 6 \times \frac{1}{100}$ $3 \times 1 + 8 \times 10^{-1} + 6 \times 10^{-2}$ $3{,}120{,}000 = 3.12 \times 1000{,}000$ $= 3.12 \times 10^6$	3. Represent in scientific notation. a. 6,000 b. 13,000,000 c. .006 d. 8.00007

Course or Grade: Math. II

Concept: Metric System

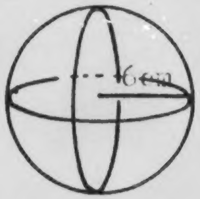
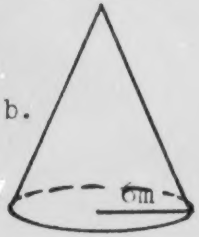
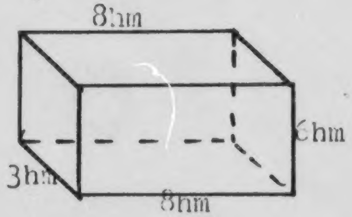
Objective: At the conclusion of this section, students will demonstrate a knowledge of the metric system. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify the following units of length: meter, millimeter, decimeter, centimeter, dekameter, hecometer, kilometer.	Measure common distances: height, sidewalk width, chalkboard.	1. As a group activity, identify a. meter b. hectometer c. dekameter d. kilometer
2. Demonstrate the use of the meter stick and the 30 cm ruler.	Small group activity Materials: 1. meter stick 2. map of school with designated lengths to measure Measure to the nearest centimeter.	2. Measure the following segments. a. ____________ b. ________ c. ______________
3. Demonstrate a knowledge of area formulas and the arithmetic to find areas using metric units of measure.	"Musical Chair" figures to be measured in metric units. Review formulas for circle, triangle, rectangle, square, trapezoid. Tansparencies 3M in frames.	3. State the formula for the area of each figure and find the area. a.  b.  c. 

Course or Grade: Math. II

Concept: Metric System

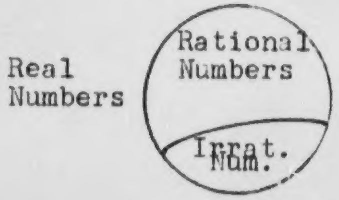
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4 Demonstrate a knowledge of volume formulas and the arithmetic to find volumes using metric units of measure.	Transparencies 3M in frames Review volume formulas. Clear plastic and wooden figures	4. Find the volume of the given figures. a.  b.  c. 
5. Demonstrate a knowledge of mass and capacity by measurement.	Clear figures filled with colored water to measure capacity. Wooden figures measured on a balance scale. (Borrow from chemistry department) $1\ cm^3\ H_2O$ has mass 1 gram	5. "Musical Chairs" Test. a. Weigh given figures. b. Fill figures with water.

Course or Grade: Math. II

Concept: The Real Number System

Objective: At the conclusion of this section, students will demonstrate a knowledge of the real number system. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify rational and irrational numbers.	Poster on Pi showing 8126 places.  	1. Classify the following as rational or irrational. a. 3/5 b. 1 2/3 c. 22/7 d. π
2. Demonstrate on the number line that between any two points there exists another point.		2. Graph on a number line a number between the two given numbers. a. 6,7 b. 11, $11\frac{1}{4}$
3. Express one-to-one correspondence between the set of decimals and the set of real numbers.	Group activity: individual student number lines using felt tip pens.	
4. Graph a described subset of the real numbers.		4. On number lines, graph the following subsets of numbers. a. 1.2, -1.5, 12.5 b. $x \geq 2$ c. $x \leq 6$ d. $x > \frac{1}{2}$ e. $x \geq -3/5$

Course or Grade: Math. II

Concept: Open Number Sentences

Objective: At the conclusion of this section on open number sentences, students will demonstrate a knowledge of solving equations. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Evaluate number phrases.	Group practice.	1. Simplify: $6[3 - (2 + 1)]$
2. Recognize an open number phrase containing a variable.		2. What is the variable in $3x + 4$?
3. Translate word phrases into mathematical expressions.		3. Write the following in numbers: a. Twice some number b. Six more than twice a number.
4. Distinguish between an equation, an expression, an inequality.		4. State if each of the following is an equation or an expression. a. $4x$ b. $4x = 8$ c. $4x \leq 8$
5. Identify root, solution, solution set.	A balance scale to show equality.	5. Which of the following is a root of the given equation? $\{-4, 3, 4, 6, 0\}$ $3x + 6 = 18$
6. Exhibit transformation principles of an equation for combining in addition and subtraction; for multiplication; for division.	Illustrate rules of combining for like and unlike numbers; for multiplication of like and unlike numbers; for division of like and unlike numbers.	6. a. State the rules for combining like and unlike numbers. b. State the rules for multiplication of like and unlike numbers. c. State the rules for division of like and unlike numbers.
7. Recognize equivalent equations.	Note: Ways of getting the equation to be equal equations.	7. Match the following equivalent equations. ____$3x+6=9$ a. $x+6=16$ ____$5m-3=6$ b. $10m-6=12$ ____$\frac{1}{2}x+3=8$ c. $x+2=3$

Course or Grade: Math. II

Concept: Graphing

Objective: At the conclusion of this section, students will demonstrate a knowledge of graphing open number sentences in two variables. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify and use the words: Cartesian coordinate system; x-axis; y-axis; origin; quadrants I,II,II,IV; abscissa, ordinate.	Stamp of Cartesian coordinate system. Graph board of Cartesian coordiante system. Transparency (blue with little red stamp) Plotting points for pictures of Snoopy dog, witch, house.	1. Given the ordered pair (6,3) a. What is the abscissa? b. What is the ordinate?
2. Graph points on a grid.		2. Using a grid made by a grid stamp, label each of the following with the letter before it. A. origin I. quadrant one B. (3,-4) II. quadrant two C. (5,2) III. quadrant three D. (0,0) IV. quadrant four X. x-axis Y. y-axis
3. Apply an x-y chart and plot a linear equation.	Illustrate how to make an x-y chart and how to graph a line representing an equation such as y = 3x + 6	3. Given a grid made by a grid stamp make an x-y chart and graph the line of the equation, y = x + 2.

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GOALS OF ALGEBRA I

Students in Algebra I will:

1. Develop a basic understanding of algebraic mechanics.
2. Apply algebraic understanding to actual problems of dimension, motion, age, area, volume, percentage.
3. Develop a basic understanding of lines and the relationship between lines and the coordinate system.
4. Recognize the number systems and relate to rationals, irrationals, radicals.

ALGEBRA I EVALUATION

1. Grades from daily homework assignments.
2. Unit tests.
3. Quizzes over day-to-day achievements.
4. Chapter tests.
5. Nine weeks tests.
6. Semester tests.
7. Houghton-Mifflin standardized test over Algebra I.

Course or Grade: Algebra I

Concept: Numbers and Sets

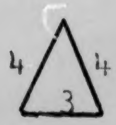
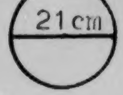
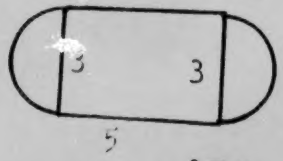
Objective: At the conclusion of this section, students will demonstrate a knowledge of sets. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Express a number by different numerical expressions.	Transparency "Real Numbers Comparison" Use balance to illustrate equations.	1. Which of the following represents the number 7? a. $5 + 2$ b. $3 + 2 + 5/5$ c. $6 + (5/5)$ d. $0 + 6 + 6(2\cdot 1)$
2. Use the equal symbol between numerical expressions to show they have the same value.		2. Place the = symbol where needed instead of the ? a. $5 + 2(3-1)$? $3\cdot 3$ b. $4 + 2\cdot 3(4-2)$? 0
3. Recognize that any statement of equality is an equation.		3. Which of the following are equations? a. $3 + 6 = 8 + 1$ b. $5 = 4 + 1(3 + 3)$
4. Use the not equal symbol between numerical expressions to show they do not have the same value.		4. Replace the ? with $\neq$ when needed. a. $5 + 6$? $(3\cdot 2\cdot 1)2 - 1$ b. $5 + 6$? $2(3\cdot 2\cdot 1) + 1$
5. Recognize that a statement that asserts two numerical expressions do not have the same value is an inequality.		5. Replace the ? with = or $\neq$. a. $5 + 6$? $12-1$ b. $3 + 8$? $4\cdot 3 + 1$

Course or Grade: Algebra I

Concept: Language of Algebra

Objective: At the conclusion of this section, students will demonstrate a knowledge of numerals and expressions. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use grouping symbols to simplify expressions.		1. Simplify $\frac{8-(2(5-2))}{4-2}$
2. Evaluate variable expressions.		2. If $w = 5$, $a = 6$, $b = 3$ find the value of $\frac{3w+6a}{b}$
3. Write exponential expressions.		3. Write in exponential form. a. $x \cdot x \cdot x \cdot x \cdot x =$ b. $(a+1)(a+1)(a+1)$
4. Evaluate expressions involving powers and other operations.		4. Simplify. a. $(x+3)^2$ when $x = 5$ b. $\frac{(x+2)^3}{3}$ when $x = 1$ c. $\frac{3a+2b}{6}$ when $a = 2$ and $b = 3$
5. Evaluate formulas, particularly geometric formulas.	Transparency, "Algebraic Expressions in Geometry--Plane Figures" Transparency, "Algebraic Expressions in Geometry--Solid Figures"	5. a. Find the perimeter.  b. Find circumference.  c. Find the perimeter. 

Course or Grade: Algebra I

Concept: Language of Algebra

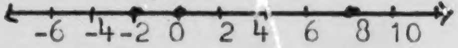
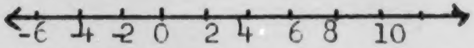
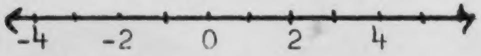
Objective: At the conclusion of this unit, students will demonstrate a knowledge of simple equations and problems. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find solution sets of open sentences.	Transparency, "Variables and Open Sentences"	1. Give $x \in \{1,2,3,4,5,6\}$, write the solution set of each open sentence. a. $x + 2 = 8$ b. $2x \neq 8$ c. $x^2 = 4$
2. Convert words into symbols.	FS374 and TC316, "Word Problems: Writing Equations" in PHS library FS373 and TC317, "Word Problems: Writing and Solving Equations" in PHS library.	2. Convert each sentence into an equation. Use x to represent the number. a. Four less than the number is seven. b. The sum of six and three times the number is twelve.
3. Learn a method for solving problems.	Show a 5 step plan for solving a word problem.	3. Solve this problem by using an equation. Jean said, "Three less than my number is -12." Find Jean's number.

Course or Grade: Algebra I

Concept: Addition and Subtraction

Objective: At the conclusion of this unit, students will demonstrate a knowledge of adding real numbers. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Graph sets of real numbers on a number line and read graphs.	Magnetic number line.	1. a. Given the number line, name the set represented.  b. a move from -6 to 4 is a move in the ____ direction.  c. Given the number line, graph the **origin**. 
2. Add real numbers using the number line as a guide.	Magnetic number line "Stair Stack"	2. On a number line, graph the sentence. $(-2 + 2) + 7 = 3$
3. Use the meaning of opposites and absolute values to solve problems and simplify expressions.	Emphasize: $-(-a) = a$	3. Simplify. a. $\|-2\|$ b. $- \|-7\|$ c. $-(-\|-6\| + \|-6\|)$
4. Add real numbers without using a number line.	Discuss adding "like" numbers and "unlike" numbers.	4. Simplify. a. $-3 + 7 + (-2) + 5$ b. $6 + (-1) + (-5)$ c. $-60 + 124 + (-31) + (-90) + 4$

Course or Grade: Algebra I

Concept: Addition and Subtraction

Objective: At the conclusion of of this section, students will demonstrate a knowledge of solving equations by transforming. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use "transformation by additon" to solve simple equations.	Match properties with examples. Transparency, "Commutative and Associative Axioms--Addition"	1. Solve. a. -20 + k = -80 b. 6 = 9 + (-v)
2. Express differences and simplify expressions containing differences.	a-b + a + (-b) is read "a minus b is equal to the opposite of b." Remember: Subtraction is not commutative or associative.	2. Simplify. a. -23 -(-9) b. 18 - 14 + 13 + 4 - 20 - 12
3. Solve equations involving subtraction.		3. Use transformation by subtraction to solve these equations. a. x + 2 = 7 b. 17 - t = -5 c. Seven less than a number is -13. Find the number.

Course or Grade: Algebra I

Concept: Multiplication and Division

Objective: At the conclusion of this section, students will demonstrate a knowledge of multiplying real numbers. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify the commutative property of multiplication, the associative property of multiplication, the multiplicative property of -1.	Multiplication/division rules: like: positive unlike: negative	1. Match by placing the correct letter in front of the property. a. Commutative of multiplication b. Associative of multiplication c. $(-a)(-b)$ d. $(a)(-b)$ ___$(ab)c = a(bc)$ ___$ab = ba$ ___$-a = (-1)a$ ___ab
2. Multiply real numbers.		2. Simplify. a. $(-20)(-4)(12)$ b. $(-3)(5)(-6)(-2)$ c. $(-2)^4(-1)^2$ d. $(-3)^3(-10)(-6)$
3. Use the distributive property in computation.	Use colored chalk on chalkboard in illustrating distributive property.	3. Simplify. a. $36(-8 + 19)$ b. $-2(3 + 1) + 3(2 - 6)$ c. $-(-3 + 15)$
4. Use the reciprocal, or multiplicative inverse, of a number.	Stress $b \neq 0$ in the definition of reciprocal.	4. Simplify. a. $\frac{1}{a}(6ab)$ b. $\frac{1}{4}(6 \cdot 4)$ c. $\frac{1}{8}(64)$

Course or Grade: Algebra I

Concept: Multiplication and Division

Objective: At the conclusion of this section, students will demonstrate a knowledge of transforming equations. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use "transformation by multiplication" to solve simple equations.	Transparency, "Transforming Equations" Transparency, "The Special Numbers 0 and 1"	1. Solve. $-\frac{1}{20}x = 3$
2. Express quotients and simplify expressions involving quotients.	Illustrate the Multiplication Property of Equality. Illustrate the rule for division: $a \div b = a \cdot \frac{1}{b} = \frac{a}{b}$ Emphasize that division by zero has no meaning in the set of reals. Emphasize that division is not commutative or associative.	2. True or False. a. $\frac{5}{8} = \frac{5}{1} \cdot \frac{1}{8}$ b. $\frac{5}{3} = 5 \cdot \frac{1}{3}$ c. $\frac{5}{6} = 5 \cdot \frac{6}{1}$ d. $6 \div 0 = 6$ e. $0 \div 6 = 0$
3. Solve equations involving division.		3. Solve. a. $30x = 510$ b. $-32q = 608$ c. $\frac{1}{8}x = 24$
4. Use several transformations to solve equations.	Develop a 4 step plan for solving equations using inverse operations.	4. Solve. a. $3(x + 3) = -15$ b. $2(3x - 2) = 11$

Course or Grade: Algebra I

Concept: Multiplication and Division

Objective: ___

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
5. Learn the basic axioms of algebra.	Define axiom and theorem. Transparency: "Picturing the Distributive Axiom" Handout on axioms and properties of algebra. Matching exercises.	5. Match. a. If $a = b$, then $b = a$ b. $a = a$ c. If a and b are real numbers, then $a + b$ is a real number. d. If $a = b$, and $b = c$, then $a = c$. e. $3 \cdot 2 = 2 \cdot 3$ or $ab = ba$ f. $3(2+a) = 6 + 3a$ or $a(b+c) = ab + ac$ g. $a + (-a) = 0$ ___Reflexive property ___Symmetric property ___Transitive property ___Closure property for addition ___Commutative property for multiplication ___Axiom of additive inverse ___Distributive property

Course or Grade: Algebra I

Concept: Working with Polynomials

Objective: At the conclusion of the section, students will demonstrate a knowledge of addition and subtraction of polynomials. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use the distributive axiom to simplify expressions containing similar terms.		1. Simplify. a. $-11t + (-31) + 7t + (-9)$ b. $3(a + 2b) + (-1)(b + 2a)$
2. Solve equations containing similar terms.		2. Solve. a. $7x - 2 + x = 14$ b. $2(y - 1) - y = -3$
3. Solve equations having the variable in both members.		3. Solve. a. $3r - 2 = r + 6$ b. Find a number which is 24 greater than twice its opposite.
4. Solve some problems involving several ages.	Use a chart to represent ages and the 5 step plan for solving problems.	4. Karen is three times as old as she was eight years ago. How old is she now?
5. Solve some problems involving integers.	Discuss consecutive integers, consecutive even and consecutive odd integers.	5. Find three consecutive integers whose sum is -9.
6. Add and subtract polynomials.	Define monomial, degree of a monomial, constant term, polynomial.	6. a. Add: $\begin{array}{r} 4x + 2 \\ \underline{x - 1} \end{array}$ b. Subtract: $\begin{array}{r} 3a + 2b \\ \underline{a - b} \end{array}$

Course or Grade: Algebra I

Concept: Working with Polynomials

Objective: At the conclusion of this section, students will demonstrate a knowledge of multiplication of polynomials. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Multiply monomials.	Prove: $b^m b^n = b^{m+n}$	1. Simplify. a. $(2c)(3c^2d)(2d^2)$ b. $(2a)(3a^3) + (2a^2)(a^2)$
2. Find the powers of monomials	Prove: $(ab)^m = a^m b^m$ $(b^m)^n = b^{mn}$	2. Simplify. a. $(2a)^2 \ (u^2v)^3 \ (w)$ b. $(-1)^5 \ (5p^2)^2 \ (p^2q)3$
3. Multiply a polynomial by a monomial.	Transparency, "Multiplying a Polynomial by a Monomial" Illustrate using colored chalk on chalkboard.	3. Simplify: $2xy^2(2 - x - x^2y)$
4. Multiply polynomials by multiplying each term of one polynomial by each term of the other and write the sum of the products.	Transparency, "Multiplying Two Polynomials" Illustrate FOIL method.	4. Multiply. a. $(2x + 1)(x - 3)$ b. $(3x + 1)(3x - 1)$
5. Solve some problems involvin area.	Suggest a diagram be used with each problem.	5. a. Write a polynomial which represents the number described. Be sure to tell what each variable represents. The area of a rectangle which is 10cm longer than it is wide. b. A rectangular swimming pool is 7m longer than it is wide. It is surrounded by a concrete walk 1.5m wide, the area of which is 120 square meters. Find the dimensions of the pool.

Course or Grade: Algebra I

Concept: Factoring

Objective: At the conclusion of this section, students will demonstrate a knowledge of quotients and factoring. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Factor integers in specific ways.	Discuss prime numbers, composite numbers, prime fac- Discuss divisibility rules for 2,3,4,5,6,7,9,10.	1. Find the prime factorization of each integer. a. 144 b. 51 c. 576
2. Divide and factor monomials.	Develop rules of exponents for division.	2. Simplify. a. $\frac{13c^8d^{10}}{26\,cd}$ b. $\frac{27\,u^2v^3}{-18u^4v^5}$
3. Divide a polynomial by a monomial and find a monomial factor of a polynomial.	Distinguish between a monomial factor and the greatest monomial factor Transparency, "Dividing a Polynomial by a Monomial"	3. Simplify. a. $\frac{8a^3 - 4a^2 + 2a}{2a}$ b. $\frac{6x - 4}{2} + \frac{3x + 6}{3}$ Factor. a. $5u^2 - 10$ b. $4a^2 - 9a$

Course or Grade: Algebra I

Concept: Factoring

Objective: At the conclusion of this section, students will demonstrate a knowledge of special products and factoring. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Simplify products of the form $(a + b)(a - b)$ and to factor differences of squares.	Using teacher prepared transparencies show the product of the sum and difference of two numbers. Teacher made transparency with overlays showing the geometric representation of $(a+b)(a-b)$	1. Factor. a. $a^2 - b^2$ b. $x^2 - 64$ Multiply. a. $(x + 5)(x - 5)$ b. $(3s + 1)(3s - 1)$
2. Square binomials mentally and factor trinomial squares.	Using prepared transparencies, show 3 step method for squaring a binomial. Show 3 step method for recognizing a trinomial square.	2. Express each product as a polynomial. a. $(x + 2)^2$ b. $(a - 1)^2$ Factor. a. $x^2 + 4x + 4$ b. $x^2 - 6x + 9$
3. Find the product of two binomials mentally.	Illustrate the FOIL method.	3. Express as a polynomial. a. $(a + 8)(a - 3)$ b. $(a + 8)(a + 3)$
4. Factor quadratic trinomials when the coefficient of the quadratic term is one and the constant term is positive.		4. Factor. a. $x^2 - 9x + 20$ b. $x^2 + 8x + 12$
5. Factor quadratic trinomials when the coefficient of the quadratic term is one and the constant term is negative.	TC86, "Factoring a Complete Trinomial", from PHS library.	5. Factor. a. $x^2 - x - 6$ b. $x^2 + 6x - 16$

Course or Grade: Algebra I

Concept: Factoring

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
6. Factor quadratic trinomials when the coefficient of the quadratic term is a positive integer, not one.	TC87, "Factoring a General Trinomial", from PHS library.	6. Factor. a. $4x^2 - 8x + 5$ b. $2x^2 - 2x - 12$
7. Factor by grouping.		7. Factor. a. $a(a + 3) + (a + 3)$ b. $x^2 + 2x + xy + 2y$
8. Factor using several methods of factoring.	Hand out flow chart on methods of factoring. Use a checklist for factoring polynomials.	8. Factor. a. $3t^2 - 3$ b. $x^4 - y^4$ c. $x^4 - 3x^2 - 4$

Course or Grade: Algebra I

Concept: Factoring

Objective: At the conclusion of this section, students will demonstrate a knowledge of applications of factoring. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Solve equations when one member is in factored form and the other member is zero.	Transparency of proof of the theorem: If $ab = 0$, then $a = 0$ or $b = 0$.	1. Solve for x. a. $y(y - 2) = 0$ b. $x(x - 2)(x + 2) = 0$
2. Solve some polynomial equations by factoring.	Define degree of a polynomial equation, linear equation, quadratic equation, cubic equation.	2. Solve. a. $2x^2 - x - 1 = 0$ b. $s^2 = 56s - s^3$
3. Apply the method of solving equations by factoring to solve word problems.		3. In designing a book, a printer wishes to have a 180 square centimeter rectangle of printing on each page surrounded by margins of equal width. How wide should the margins be if the page is 16 centimeters by 24 centimeters?

Course or Grade: Algebra I

Concept: Working With Fractions

Objective: At the conclusion of this section, students will demonstrate a knowledge of reducing, multiplying, and dividing fractions. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use factoring to reduce fractions to lowest terms.	Emphasize that fractions cannot be reduced unless they are expressed in factored form.	1. Reduce. a. $\frac{21a^2}{7}$ b. $\frac{2d^2 + 6}{2d + 6}$ c. $\frac{y^2 - 2y - 15}{y^2 + 10y + 21}$
2. Express ratios of two quantities and use ratios in solving problems.		2. Find the ratio x:y. $\frac{2x + 3y}{3y} = \frac{5}{2}$
3. Multiply fractions.	Transparency, "Multiplying Fractions"	3. Simplify. a. $\frac{-22cd^2}{2d} \cdot \frac{17c^2d}{17d}$ b. $\frac{2(x + 1)}{(x + 1)} \cdot \frac{x^2 + x - 2}{x^2 - x - 2}$
4. Divide fractions.	Transparency, "Dividing Fractions" Show how complex fractions can be simplified.	4. Simplify. a. $\frac{x^2 - 4}{x^2 - 5x + 6} \div \frac{x^2 + 3x + 2}{x^2 - 2x - 3}$ b. $\frac{\frac{m + n}{x}}{\frac{m^2 - n^2}{x^2}}$
5. Simplify expressions involving multiplication and division.		5. Simplify. $\frac{r}{r + 3} - \frac{3r^2}{3r + 9} \cdot \frac{r^2 + 4r + 3}{r^2 - 9}$

Course or Grade: Algebra I

Concept: Working With Fractions

Objective: At the conclusion of this section, students will demonstrate a knowledge of sums and mixed expressions. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Add and subtract fractions.	Transparency, "Sums of Fractions with Unequal Denominators" Show a method of determining the L.C.D.	1. Add. $\frac{2x - y}{2y} + \frac{x + y}{x}$
2. Change mixed expressions to fractions and fractions to mixed expressions.		2. a. Express the mixed expression as a fraction in lowest terms. $a + \frac{6}{a + 1}$ b. Change $\frac{22x^4 - 33x}{11x^2}$ to a mixed expression.
3. Divide a polynomial by a polynomial.	Transparency, "Dividing a Polynomial by a Polynomial"	3. Divide. $3x + 2 \overline{)\,12x^2 - x - 6}$

Course or Grade: Algebra I

Concept: Working With Fractions

Objective: At the conclusion of this section, students will demonstrate a knowledge of fractions and equations. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Solve equations in which the numerical coefficients are fractions.	Transparency, "Solving a Fractional Equation"	1. Solve. $\frac{6}{7}y - \frac{1}{2}y = 5$
2. Solve fractional equations.		2. Solve. a. $\frac{18}{x} = \frac{3 + 3x}{x}$ b. $\frac{x - 3}{4x} = \frac{2}{x + 3}$
3. Solve problems involving percents.	Define proportion and percentage.	3. Out of 1250 persons surveyed, 32% felt that the most serious problem facing the world today is gas shortage. How many people gave this reply?

Course or Grade: Algebra I

Concept: Working With Fractions

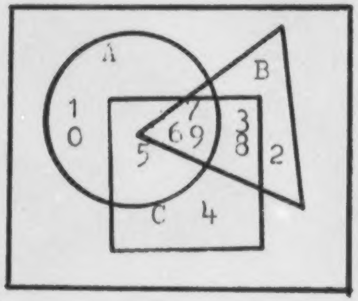
Objective: At the conclusion of this section, students will demonstrate a knowledge of applications of fractions. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Solve percent-mixture problems.	Illustrate examples using a table.	1. How many kilograms of water must be added to 60 kilograms of an 80% acid solution to produce a 70% acid solution?
2. Solve problems involving investments.	Illustrate the formula, $I = prt$	2. If $900 is invested at $4\frac{1}{2}$% per year, how much simple interest is earned in 3 years?
3. Solve problems involving uniform motion.	FS372 and TC318, "Word Problems: Time, Distance, and Rate" in PHS library	3. Two jets leave Chicago at the same time, one flying due west at 750 km/h, the other flying due east at 850 km/h. After how long will the planes be 4000 km apart?
4. Solve some problems that deal with the rate of doing things.	Illustrate the work formula, $W = RT$	4. Pete can do a job in 50 minutes while his brother Jim can do it in $\frac{1}{2}$ the time. How long will it take them to do the job working together?

Course or Grade: Algebra I

Concept: Inequalities

Objective: At the conclusion of this section, students will demonstrate a knowledge of order and inequalities. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Express the order of real numbers.		1. Replace each ? with one of the symbols > or < to make a true statement. a. $-6 ? 0$ b. $4 ? 2 + 3$
2. Interpret and graph subsets of the real numbers.		2. Graph {the natural numbers less than 2}.
3. Transform inequalities and find their solution sets.	Transparency, "Axioms of Equality and Inequality" Transparency, "Solving an Inequality-I"	3. Solve. a. $3y + 1 < 13$ b. $2(t - 3) > 3(t + 2)$
4. Solve problems involving inequalities.	Transparency, "Solving an Inequality-II"	4. Of all pairs of consecutive even integers whose sum is less than 50, find the pair whose sum is greatest.
5. Find unions and intersections of sets.		5. In the figure, list the members of each of the following sets. a. $A \cup B$ b. $A \cap B$ c. $(A \cap B) \cup C$  A B C 1 0 7 6 9 3 8 5 2 4
6. Find the solution sets of combined inequalities.		6. Solve and graph. a. $-1 < x - 2 < 4$ b. $2x + 1 \leq -5$ or $2x + 1 \geq 5$

Course or Grade: Algebra I

Concept: Relations and Functions

Objective: At the conclusion of this section, students will demonstrate a knowledge of graphing functions and relations. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Recognize what a function is and how to find its values.	Define relation, function, domain, range, one-to one correspondence, mapping.	1. State the range of the function $f(x) = 2x - 1$ with domain $\{1,2,3\}$
2. Demonstrate ways of defining functions.	Define and illustrate horizontal and vertical axes, abscissa, ordinate, coordinates, quadrants, coordinate plane, rectangular coordinate system. Briefly discuss Rene Descartes.	2. On a grid, graph all points in which the sum of the abscissa and the ordinate is 6.
3. Demonstrate how to graph ordered pairs of numbers in a coordinate plane, and how to read coordinates of points on a graph.		3. Graph, on a grid, the points $(2,7),(1,4),(-2,-5)$.
4. Recognize what relations are and how to graph them on a coordinate plane.		4. Given the ordered pairs $(1,2)$, $(3,4),(4,2),(1,0)$. Is it a relation? Is it a function? Graph the pairs on a grid.
5. Find solution sets of open sentences in two variables with given replacement sets for the variables.	Transparency, " Graph of a Linear Equation in Two Variables"	5. Find the solution set of $y = 2x + 1$ if you are given $\{-1,0,1,2\}$ is the replacement set of x.

Course or Grade: Algebra I

Concept: Relations and Functions

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS
6. Graph a linear equation in two variables.	
7. Solve for the slope of a line given the graph of the line or an equation of the line or two points on the line.	
8. Use the slope intercept form of an equation of a line.	
9. Find an equation of a line given the slope and one point on the line, or two points on the line.	
10. Use direct variations to solve problems.	Define means, extremes, constant of proportionality. Transparency, "Variation"

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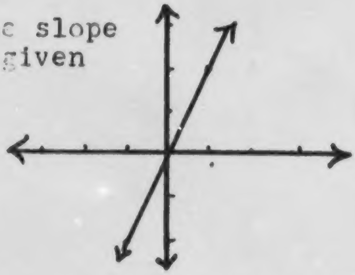
6. Graph the equation $y = 3x - 4$.

7. a. Find the slope of the given line.



b. Find the slope of the line having the equation $x + 2y = 6$.

c. Find the slope of the line through the points (2,3) and (7,6).

8. Write a linear equation in standard form when $m = -2$ and $b = 3$.

9. a. State the equation of the line containing the point (2,-2) and having slope 2/3.
b. Find an equation in standard form of the line passing through (3,-1) and (4,5).

10. a. In the direct variation, find the missing value. $x_1=20$, $x_2=25$, $y_1=100$, $y_2=?$
b. An employee's wages are directly proportional to the time worked. If the salary is $200 for 5 days, how much will it be for 18 days?

Course or Grade: Algebra I

Concept: Systems of Open Sentences in Two Variables

Objective: At the conclusion of this section, students will demonstrate a knowledge of solving systems of linear equations and inequalities. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use graphs to find the solutions of pairs of linear equations in two variables.	Transparency, "Equivalent Systems"	1. Solve the following system by graphing. $y = x + 3$ $y = 2x - 5$
2. Use the substitution method to find the solutions of pairs of linear equations in two variables.		2. Solve the following system by substitution. $x + y = 6$ $2x + y = 11$
3. Use pairs of linear equations in two variables to solve problems.	FS370 and TC320, "Word Problems: Two Unknowns" in PHS library.	3. An engineer worked for 6 days and an assistant worked for 7 days investigating the effects of manufacturing processes which contribute to air pollution. Together they received a salary of $450. The following week, the engineer worked 5 days and the assistant worked 3 days for a combined salary of $290. Find the daily wages of each.
4. Use the addition-or-subtraction method to find the solutions of pairs of linear equations in two variables.	Show a 4 step method for solution by addition-or-subtraction of a pair of linear equations.	4. Solve by addition or subtraction. a. $x + y = 3$, $2x + y = 5$ b. $3x + 2y = -17$, $x - 3y = 9$
5. Use systems of equations to solve certain kinds of puzzle problems.	Review digit problems, age problems, fraction problems, uniform-motion problems.	5. a. The sum of the digits is 9. The number is diminished by 45 when the digits are reversed. What is the original number?

Course or Grade: Algebra I

Concept: Systems of Open Sentences in Two Variables

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
		5. b. Kathy's mother is 4 years younger than her father. When they were married, she was 6/7 as old as her husband. At what age were they married? c. The denominator of a fraction is two more than the numerator. If one is subtracted from each, then the value of the resulting fraction is $\frac{1}{2}$. Find the original fraction. d. A plane flew 600km downwind from Central City to Carlsbad in 1 2/3 hours and returned over the same route against the wind in two hours. Find the rate in kilometers per hour of the plane in still air and the wind.
6. Graph the solution sets of systems of linear inequalities in two variables.	Transparency, "Graph of an Inequality in Two Variables"	6. Graph $\left.\begin{array}{l} y \leq x + 1 \\ y > 2x \end{array}\right\}$

Course or Grade: Algebra I

Concept: Rational and Irrational Numbers

Objective: At the conclusion of this section, students will demonstrate a knowledge of rational numbers. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use properties of rational numbers.	Define rational number, irrational number, property of density.	1. Arrange the members of each set in increasing order. a. $\left\{ \frac{1}{3}, \frac{-3}{4}, \frac{7}{8} \right\}$ b. $\left\{ \frac{-5}{6}, \frac{1}{21}, \frac{-3}{7} \right\}$
2. Express rational numbers in fractional or decimal form.		2. a. Find the difference of the given numbers, and name a number between them. 0.127 and $\frac{1}{8}$ b. Write $.\overline{57}$ as a reduced fraction.
3. Find square roots of square numbers and quotients of square numbers.	Define principal square root. Develop product property of square roots. Develop quotient property of square roots.	3. Simplify. a. $\sqrt{\frac{16}{729}}$ b. $\pm\sqrt{.0324}$ c. $\sqrt{\frac{24}{150}}$
4. Find decimal approximations to irration square roots.	Teach divide-and-average method and the traditional method using a hand-out. Show how to use square root tables. Show how to find square roots using a hand-held calculator.	4. Simplify. Find answer to hundredths. a. $\sqrt{450}$ b. $\sqrt{63}$

Course or Grade: Algebra I

Concept: Rational and Irrational Numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
5. Find square roots of variable expressions and how to use them to solve equations and problems.		5. Solve. a. $36y^2 - 81 = 0$ b. $700 = 5x^2$ to the nearest tenth. c. A television station claims clear reception in a circular area of 3300 square kilometers. Find, to the nearest kilometer, how far you could live from the station to get clear reception.
6. Use the Pythagorean Theorem and its converse to con- lengths measured by irrational numbers and to solve other geometric problems.	Transparency, "The Pythagorean Theorem" Bulletin board showing several proofs and information about Pythagoras. Discuss Pythagorean triples, and Pythagorean quadruples if interest is shown.	6. In a "shed" roof, the height is $\frac{1}{2}$ the width w of the building. Find the length of the rafter r if a building is 12 meters wide.

Course or Grade: Algebra I

Concept: Rational and Irrational Numbers

Objective: At the conclusion of this section, students will demonstrate a knowledge of simplifying radicals. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Simplify products and quotients of radicals.	Demonstrate that an expression having a square-root radical is in simplest form when: a) no integral radicand has a square factor other than one b) no fractions are under a radical sign c) no radicals are in the denominator.	1. Simplify. a. $\frac{10\sqrt{7}}{2\sqrt{5}}$ b. $7\sqrt{147}$ c. $(-2\sqrt{rs^2})(-3\sqrt{rs})$
2. Simplify sums and differences of radicals.		2. Simplify. a. $\sqrt{10} - \sqrt{\frac{2}{5}}$ b. $\sqrt{16} - 2\sqrt{8}$
3. Multiply binomials containing square root radicals.	Define conjugate.	3. Simplify. a. $(7\sqrt{7} + \sqrt{3})(2\sqrt{7} - \sqrt{3})$ b. $\frac{1 + \sqrt{7}}{2 - \sqrt{7}}$
4. Solve radical equations.		4. Solve. a. $\sqrt{10}\, y = \frac{1}{4}$ b. $\sqrt{z - 5} = 6$ c. $5\sqrt{t} = 15\sqrt{2}$

GOALS OF GEOMETRY

Students in Geometry will:

1. Better understand the nature of a mathematical system and appreciate the basic structure of geometry.
2. Develop powers of spatial visualization.
3. Gain a basic understanding of the methods of coordinate geometry and recognize the way in which algebra and geometry complement each other.
4. Perceive the role of inductive and deductive reasoning in both mathematical and nonmathematical situations.
5. Further strengthen his basic algebraic skills.
6. Appreciate the need for clarity and precision of language.

Geometry evaluation:

1. Grades from daily homework assignments.
2. Unit tests.
3. Frequent quizzes over basic formulas or concepts.
4. Chapter tests and nine-week tests.
5. Standardized Mid-Year Geometry Test
6. Standardized Geometry Test

Course or Grade Geometry

Concept: Elements of Geometry

Objective: At the conclusion of the first unit of Geometry, students will demonstrate a knowledge of points, lines and planes. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Recall the minimum conditions for exactly determining a line, a plane or space by choosing the number and kind of points necessary to describe a line, plane or space.	Filmstrip on Points, Lines, Planes	1. Choose the correct answer. Space is exactly determined by a. 2 points b. 3 non-collinear points c. 3 non-coplanar points d. 4 non-coplanar points A plane is exactly determined by a. 3 non-collinear points b. one line and a point not on the line c. two intersecting lines d. all of the above A line is exactly determined by a. 1 point b. 2 distinct points c. a plane d. space
2. Choose whether no planes, one plane or many planes are determined by certain conditions.	Transparency with overlays on "Determining Planes and Their Intersections"	2. Choose the correct answer. Three non-collinear points a. do not lie in the same plane b. lie in one and only one plane c. lie in infinitely many planes A line and one point not on that line a. do not lie in the same plane b. lie in one and only one plane c. lie in infinitely many planes

Course or Grade Geometry

Concept: Elements of Geometry

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
3. Analyze whether given sets of points and lines are collinear or coplanar by matching the set with a description.		3. Write the letter representing the best possible answer in the blank provided. ___ Two points — a. may be collinear ___ Three points — b. must be collinear ___ Four points — c. may be coplanar ___ One line — d. must be coplanar ___ Two intersecting lines — e. a and c ___ One line and 1 point not on the line — f. a and d g. b and c ___ One line and 2 points not on the line — h. b and d
4. Recall the definition or description of certain sets of points by matching the set of points with the description.	Filmstrip on Distance and Betweenness	4. Write the letter representing the best possible description or property in the blank provided. ___ $\overline{AB}$ ___ $\overrightarrow{AB}$ ___ Collinear points ___ Coplanar points ___ Opposite rays ___ AB a. AB and BA b. Points contained in a straight line c. Points A and B and points between A and B d. Points contained in a plane. e. Union of segment AB and all points P such that B is between A and P. f. $\overrightarrow{AB}$ and $\overrightarrow{AC}$ with A between B and C.

Course or Grade Geometry

Concept: Elements of Geometry

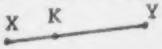
Objective: At the conclusion of the second unit of Geometry, students will demonstrate a knowledge of the types of thinking used in geometric proofs. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Distinguish between deductive and inductive thinking.	Filmstrip, Proof.	1. State whether the thinking process is inductive or deductive. a. The first four times Susan ate peanuts she became ill. Her mother decided:"Peanuts are bad for Susan." b. Jim knows that he is older than John. When he finds out that John is older than Rick, Jim says, "I'm older than Rick."
2. Recognize the hypothesis and conclusion of a conditional.		2. Use the conditional: The party will be cancelled if it rains. a. State the hypothesis. b. State the conclusion.
3. Write a statement in "if-then" form.		3. Express in "if-then" form: A person who can run fast has an advantage.
4. Express the converse, inverse, contrapositive of a conditional.		4. Use the conditional: If a figure is a square, then it is a rectangle. a. State the converse. b. State the inverse. c. State the contrapositive.

Course or Grade Geometry

Concept: Elements of Geometry

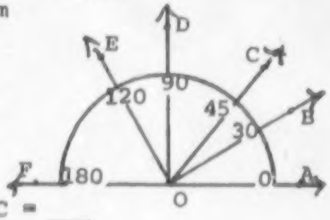
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
5. Write a simple proof in two-column form showing the given, prove, drawing, statements and reasons.	Emphasize neatness and form using a straight edge for drawing.	1. Write a proof in two column form. Given: XKY Prove: XK = XY - KY 

Course or Grade Geometry

Concept: Angles and Perpendicular Lines

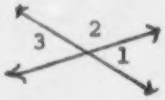
Objective: At the conclusion of the first unit on angles and perpendicular lines, students will demonstrate a knowledge of angles, half-planes, special angles, angle measurement. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify properties of angles and half-planes.	Filmstrip, Angles. Transparency and worksheets from Millken's Transparency-Duplicating Book on Geometry named "Interior of angle."	1. Refer to the angle picture. a. List 4 ways of naming an angle. b. The vertex of the angle is point ? c. One side of the angle is ? Line g separates a plane into two half-planes. Points R and S lie in one of the half-planes, and point T lies in the other. Complete each statement by writing "must", "might", or "cannot". a. $\overline{RS}$ ____ intersect g. b. $\overline{RT}$ ____ intersect g c. $\overline{ST}$ ____ intersect g d. $\overrightarrow{RS}$ ____ intersect g e. $\overleftrightarrow{RS}$ ____ intersect g.
2. Use the Protractor Postulate and the Angle Addition Postulate to measure angles.	Students should use protractors individually to measure angles and gain experience in drawing them.	2. Some rays and the numbers paired with them are shown. a. m$\angle$BOA = ___ b. m$\angle$COA = ___ c. m$\angle$COB = ___ d. m$\angle$EOD + m$\angle$DOC = ___  D E C B F A O 0 30 45 90 120 180

Course or Grade Geometry

Concept: Angles and Perpendicular Lines

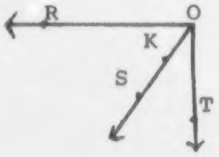
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
3. Identify properties of special angles: congruent, acute, right, obtuse, complementary, supplementary, dihedral, adjacent, vertical angles, bisector of an angle.	Use transparency and overlays "Angles-Complementary and Supplementary." Use transparency and overlays "Angles Formed by Intersecting Planes."	3. Complete the statements about the special angles. a. The measure of a right angle ______ 90. (</=/>) b. The measure of an acute angle ______ 90. (</=/>) c. The measure of an obtuse angle ______ 90. (</=/>) d. The sum of the measures of two complementary angles = ___. e. If ∠1 and ∠2 are supplementary angles, then m∠1 + m∠2 = ___. f. If $\overrightarrow{SX}$ is the bisector of ∠RST, then m∠RSX = m∠ ____.  g. ∠1 and ∠ ___ are vertical angles. h. ∠1 and ∠ ___ are adjacent angles.

Course or Grade Geometry

Concept: Angles and Perpendicular Lines

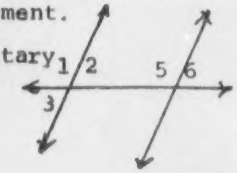
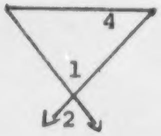
Objective: At the conclusion of the second unit on angles and perpendicular lines, students will demonstrate a knowledge of theorems about angles and perpendicular lines. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Recognize the information conveyed by a diagram.	It is desirable for students to learn the statements of postulates and theorems. Different methods work with different classes. Some prefer learning them by taking memorization tests; others prefer practice using the response boxes. Student notebooks of theorems and postulates is effective.	1. You are given the plane figure shown. Can you conclude from the diagram (write yes or no) that:  a. $m\angle SOT = 30$ b. $\overline{OT} \cong \overline{OR}$ c. K lies between O and S. d. K is the midpoint of $\overline{OS}$. e. $\angle ROS$ and $\angle SOT$ are adjacent angles. f. K lines in the interior of $\angle ROT$.
2. Apply the definition of perpendicular lines and a line perpendicular to a plane to determine true statements.		2. Classify each statement as true or false. a. If two lines form right angles, the lines are perpendicular. b. If two lines form congruent adjacent angles, the lines are perpendicular. c. In a plane, through a point on a line, there are two lines perpendicular to the given line.
3. Apply the theorems that deal with perpendicular lines and right angles.		3. (continue #2 from above) d. If the exterior sides of two adjacent angles lie in perpendicular lines, the angles are supplementary. e. If two angles are adjacent, then their exterior sides lie in perpendicular lines.

Course or Grade Geometry

Concept: Angles and Perpendicular Lines

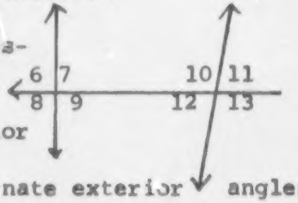
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Apply the theorems that deal with two angles complementary or supplementary to the same angle or congruent angles.		4. Write the theorem or postulate that supports the statement. a. $\angle 2$ is supplementary to $\angle 1$, and $\angle 3$ is supplementary to $\angle 1$.  b. If $\angle 3$ and $\angle 2$ are both supplementary to $\angle 1$, then $\angle 3 \cong \angle 2$ c. Since $\angle 1$ is supplementary to $\angle 2$, and $\angle 5$ is supplementary to $\angle 6$, then, if $\angle 2 \cong \angle 6$, $\angle 1 \cong \angle 5$.
5. Write simple proofs in two-column form using the theorems and postulates about angles and perpendicular lines.		5. Given: $\angle 4 \cong \angle 1$ Prove: $\angle 4 \cong \angle 2$ 

Course or Grade Geometry

Concept: Parallel Lines and Planes

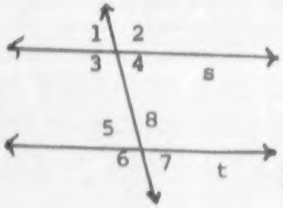
Objective: At the conclusion of the first unit on parallel lines and planes, students will demonstrate a knowledge of parallel lines and indirect proof. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Distinguish between skew lines and parallel lines.	Filmstrip, Parallelism. It is desirable that students know the statements of postulates and theoroms. Sometimes memorization tests are effective. Sometimes reading them together aloud in class and then writing them immediately from memory helps them to learn the statements.	1. Complete each of the following with one of the words "always," sometimes," or "never". a. Two skew lines are ___parallel. b. Two parallel lines are ___coplanar. c. A line in the plane of the ceiling and a line in the plane of the floor are ___parallel. d. Two lines in the plane of the floor are ___ skew. e. Two lines parallel to the same plane are __parallel to each other. f. Two lines parallel to a third line are ___parallel to each other. g. Skew lines ___intersect.
2. Identify the angles that are formed when two lines are cut by a transversal.		2. Name the figures described. a. The transversal b. 4 pairs of corresponding angles c. 2 pairs of alternate interior angles  d. 2 pairs of alternate exterior angles e. 2 pairs of interior angles on the same side of the transversal f. 2 pairs of exterior angles on the same side of the transversal

Course or Grade Geometry

Concept: Parallel Lines and Planes

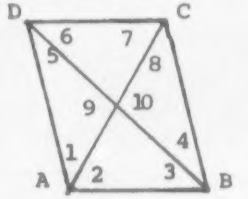
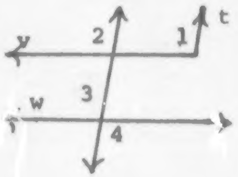
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
3. Recognize the angle relationships that exist when two parallel lines are cut by a transversal.		3. s is parallel to t Find the measure of $\angle 8$ if:  a. $m\angle 2 = 110$ b. $m\angle 3 = 112$ c. $m\angle 4 = 80$ d. $m\angle 5 = 76$ e. $m\angle 3 = 2m\angle 4$
4. Write an indirect proof.	Filmstrip on Proofs has a section on indirect proof. Transparency and worksheets from Milliken on indirect proof.	4. Use an indirect proof for the following. Given: $\angle D \ncong \angle E$ Prove: $\angle D$ and $\angle E$ are not both right angles.

Course or Grade Geometry

Concept: Parallel Lines and Planes

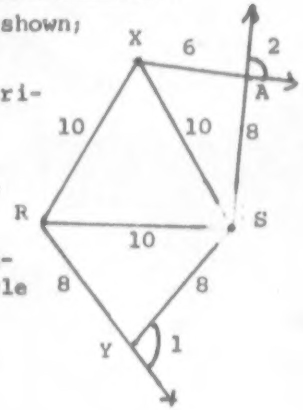
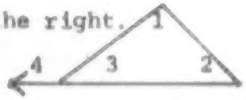
Objective: At the conclusion of the second unit on parallel lines and planes, students will demonstrate a knowledge of ways to prove lines are parallel. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Apply the postulate and theorems that can be used to prove that two lines are parallel.	Postulates and theorems should be memorized.	1. Use the information given and then identify the lines, if any, that must be parallel in the plane figure.  D C A B 1 2 3 4 5 6 7 8 9 10 a. $\angle 1 \cong \angle 8$ b. $\angle 4 \cong \angle 5$ c. $\angle 2 \cong \angle 6$ d. $\angle 6 \cong \angle 3$ e. $\angle 2 \cong \angle 7$ f. $\angle 9 \cong \angle 10$
2. Write proofs using the theorems and postulates about parallel and perpendicular lines.	Transparency with overlays "Lines and Planes, Perpendicular and Parallel".	3. Given: The plane figure; $\angle 1 \cong \angle 2$; $v \parallel w$ Prove: $\angle 1 \cong \angle 4$ 

Course or Grade Geometry

Concept: Parallel Lines and Planes

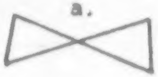
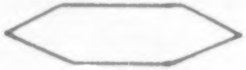
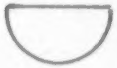
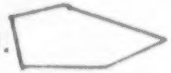
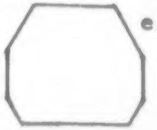
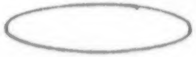
Objective: At the conclusion of the third unit on parallel lines and planes, students will demonstrate a knowledge of applying parallel lines to polygons. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Classify triangles according to sides and according to angles.	Filmstrip, Polygons. Venn diagram transparency: "Polygons." Card game called "Polygon Game" in which one tries to form books of 4 cards each using cards with properties of polygons. Plastic polygonal shapes suitable for use on the overhead projector. It is desirable to learn the statements of the theorems and corollaries.	1. Use the plane figure shown; $m\angle 1 > 90$; $m\angle 2 = 90$. a. The equilateral triangle shown is ____. b. The right triangle shown is ___. c. The isosceles, non-equilateral triangle shown is ___.  X 6 2 A 10 10 8 R S 10 8 8 Y 1
2. Identify the remote interior angles of a triangle with respect to a given exterior angle and apply the theorem about them.		2. Using the figure at the right.  a. $m\angle 1 = 105$; $m\angle 2 = 40$. Find $m\angle 4$. b. $m\angle 1 = 108$; $m\angle 4 = 156$. Find $m\angle 2$. c. $m\angle 1 = 46x + 6$; $m\angle 2 = 18x + 4$; $m\angle 4 = 70x - 2$. Find x.
3. State and apply the theorem and corollaries about the sum of the measures of the angles of a triangle.	Using a waxed paper triangle fold one vertex along its altitude to be collinear with the base. Fold the other vertices to meet the first vertex. This illustrates the sum of the angles of a triangle is 180. The waxed paper shows up well on the overhead.	3. Use the figure for #2 above. a. $m\angle 1 = 112$; $m\angle 2 = 48$. Find $m\angle 3$. b. $m\angle 1 = 6x + 10$; $m\angle 2 = 2x + 4$; $m\angle 3 = x + 4$. Find x.

Course or Grade Geometry

Concept: Parallel Lines and Planes

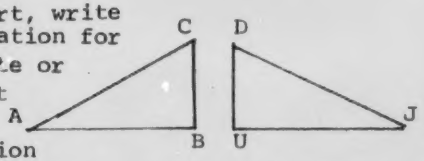
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Recognize and name convex polygons and regular polygons.	Use transparency, "Convex sets", from Milliken.	4. Determine if each figure is a polygon. If it is, name it according to the number of sides. a.  b.  c.  d.  e.  f. 
5. Know and use the formula for the sum of the measures of the interior angles of any polygon.	Geo-Tac-Toe Game III for properties of angles or sides.	5. Find the sum of the measures of the interior angles of the indicated convex polygon. a. Triangle b. Pentagon c. Octagon d. Hexagon e. Decagon f. n-gon with n = 14
6. Use the fact that the sum of the measures of the exterior angles of any convex polygon, one angle at each vertex, is 360.		6. The measure of an exterior angle of a regular convex polygon is given. How many sides does the polygon have? a. 120 b. 45 c. 90 d. 40 e. 36 f. 72

Course or Grade: Geometry

Concept: Congruent Triangles

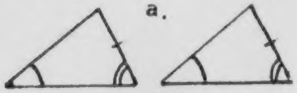
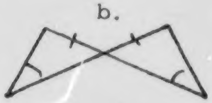
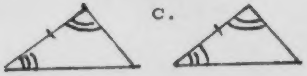
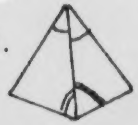
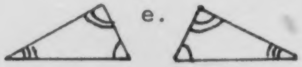
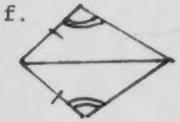
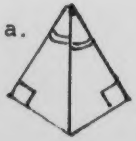
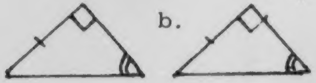
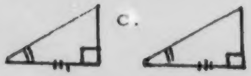
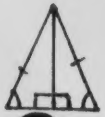
Objective: At the conclusion of the first unit on congruent triangles, students will demonstrate a knowledge of correspondences and ways of proving triangles are congruent. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify the six pairs of corresponding parts when given a correspondence statement or a congruence statement about two triangles.	Filmstrip, Congruence. Transparency, "Congruence", from Milliken. Transparency with overlays, "More Congruent Triangles." Transparency with overlays, "Finding Corresponding Parts of Congruent Triangles."	1. It is given that triangle ABC is congruent to triangle TUN. Complete. a. $\overline{BC}$ and ___are corresponding sides. b. $\angle$ B and $\angle$ ____ are corresponding angles. c. The congruence can also be stated as triangle CAB is congruent to triangle ___. d. If m$\angle$ C = 40, then m$\angle$ N = ___. e. If AB = 13, then it is also true that ___ = 13.
2. Use the SSS Postulate and the SAS Postulate to prove two triangles are congruent.		2. For each part, write the abbreviation for the postulate or theorem that justifies the conclusion that triangle ABC is congruent to triangle JUD.  a. Given: $\angle C \cong \angle D$; $\overline{BC} \cong \overline{UD}$; $\overline{CA} \cong \overline{DJ}$ b. Given: $\overline{AB} \cong \overline{JU}$; $\overline{BC} \cong \overline{UD}$; $\overline{CA} \cong \overline{DJ}$ c. Given: $\overline{AC} \cong \overline{JD}$; $\overline{AB} \cong \overline{JU}$; $\angle A \cong \angle J$
3. Use the LL Theorem and the HL Postulate to prove two right triangles are congruent.		3. Use the figure and instructions for #2 above. a. Given: $\angle$ B and $\angle$ U are right angles; $\overline{AB} \cong \overline{JU}$; $\overline{BC} \cong \overline{UD}$. b. Given: $\angle$ B and $\angle$ U are right angles; $\overline{AB} = \overline{JU}$; $\overline{AC} = \overline{JD}$.

Course or Grade Geometry

Concept: Congruent Triangles

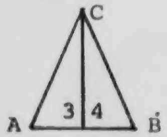
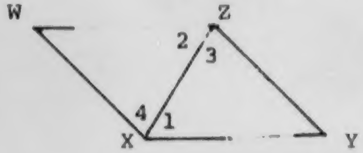
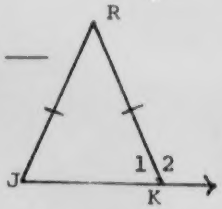
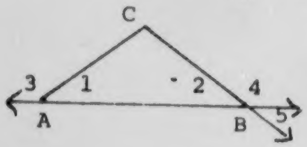
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Use the ASA Postulate and the AAS Theorem to prove two triangles congruent.		4. Some congruent segments and angles are indicated. Can the triangles be proved congruent? If so, what theorem or postulate can be used. a.  b.  c.  d.  e.  f. 
5. Use the HA Theorem and the LA Theorem to prove two right triangles congruent.		5 Some congruent segments and angles are indicated. What theorem proves the two triangles are congruent? a.  b.  c.  d. 

Course or Grade Geometry

Concept: Congruent Triangles

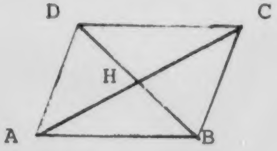
Objective: At the conclusion of the second unit on congruent triangles, students will demonstrate a knowledge of congruent segments and angles. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Prove two segments or two angles congruent by first proving that two triangles are congruent.	Review the 8 ways of proving triangles congruent.	1. Given: $\angle 3$ and $\angle 4$ are right $\angle$s ; $\overline{AC} \cong \overline{BC}$ Prove: $\overline{AX} \cong \overline{BX}$  Given: $\overline{XY} \cong \overline{ZW}$; $\overline{YZ} \cong \overline{WX}$ Prove: $\angle Y \cong \angle W$ 
2. Apply the theorems about isosceles triangles in proofs and numerical exercises.		2. Fill in the blank. a. If m$\angle 1$ = 72, m$\angle J$ = ___ b. If m$\angle 1$ = 70, m$\angle R$ = ___. c. If m$\angle 2$ = 110, m$\angle R$ = ___.  Given: $\overline{AC} \cong \overline{BC}$ Prove: $\angle 1 \cong \angle 5$ 

Course or Grade Geometry

Concept: Applying Congruent Triangles

Objective: At the conclusion of the first unit, students will demonstrate a knowledge of parallelograms. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. State and apply the theorem and corollaries that relate to the properties of a parallelogram.	Use yellow plastic models for overhead projector. Transparency with overlays, "Parallelograms and Parallel Lines." Drawings for problems are to be made using a straight edge. Students may purchase a template called a "Geometer" for use in drawing paralleograms as well as other polygons. These templates can be obtained from Academic Industries in New York.	1. Quadrilateral AXPN is a parallelogram. a. $\overline{AX} \parallel$ ___?___ b. $\overline{XP} \cong$ ___?___ c. $\angle X \cong \angle$ ___?___ d. $\triangle XPN \cong \triangle$ ___?___ e. $m\angle P + m\angle N =$ ___?___ f. If AN = 7, then XP = ___?___ g. State a theorem or corollary that supports each statement a through f above.
2. State and apply the theorems that can be used to prove that a quadrilateral is a parallelogram.		2. State the definition or theorem that supports the conclusion that quadrilateral ABCD is a parallelogram.  a. Given: $\overline{AB} \parallel \overline{DC}$; $\overline{AD} \parallel \overline{BC}$ b. Given: $\overline{AB} \cong \overline{DC}$; $\overline{AB} \parallel \overline{DC}$ c. Given: AH = CH; DH = BH d. Given: $\overline{AB} \cong \overline{DC}$; $\overline{AD} \cong \overline{BC}$

Course or Grade Geometry

Concept: Applying Congruent Triangles

Objective: At the conclusion of the second unit, students will demonstrate a knowledge of quadrilaterals
They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify using the definitions or theorems the special properties of a rectangle, a rhombus and a square.	Use yellow plastic models of these quadrilaterals on the overhead projector. Students should be able to state the theorems.	1. Complete the following chart by placing checks in the appropriate blanks.

Property	Parallelogram	Rectangle	Rhombus	Square
Opposite sides ∥				
Opposite sides ≅				
Opposite ∠s ≅				
Diagonal forms two ≅ △s				
Diagonals bisect each other				
Diagonals are ≅				
Diagonals are ⊥				
Diagonals bisect opposite ∠s				
All ∠s are rt. ∠s				
All sides are ≅				

Course or Grade Geometry

Concept: Applying Congruent Triangles

Objective:

LEARNER OUTCOMES

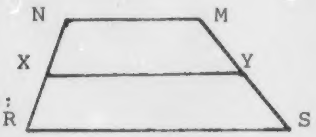
2. Apply the theorem about the median of a trapezoid.

3. Apply the theorem about the segment that joins the midpoints of two sides of a triangle.

MATERIALS/METHODS

EVALUATION

2. $\overline{XY}$ is the median of trapezoid MNRS. Using the given information, find the indicated measure.

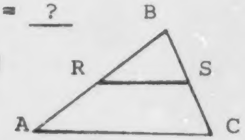


a. RS = 15; MN =7; XY = ?

b. XY = 12; RS = 15; MN = ?

c. MN = 9; RS = 14½; XY = ?

3. Points R and S are the midpoints of $\overline{AB}$ and $\overline{BC}$.



a. If AC = 14.4, RS = ?

b. If AC = x + 6 and RS = x - 1, then x = ?.

c. If AC = 3x + 1 and RS = x + 3, then RS = ?.

Course or Grade Geometry

Concept: Similar Polygons

Objective: At the conclusion of the first unit on similar polygons students will demonstrate a knowledge of definitions and properties. They will be able to:

LEARNER OUTCOMES

1. Express a ratio in simplest form.
2. Determine an unknown term in a given proportion.
3. Transform a proportion into an equivalent equation.

MATERIALS/METHODS

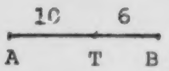
EVALUATION

1. Use the figure shown, and express the ratio in simplest form.

   a. AT:TB = ?

   b. TB:AT = ?

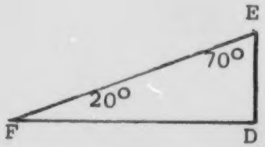
   c. AT:AB = ?



   d. m∠ F: m∠ E = ?

   e. m∠ E: m∠ D = ?

   f. m∠ D: m∠ F = ?



2. Find the value of x.

   a. $\frac{x}{12} = \frac{1}{6}$ b. $\frac{8}{x} = \frac{4}{5}$

   c. $\frac{x + 2}{10} = \frac{4}{5}$ d. $\frac{2x - 5}{20} = \frac{3}{4}$

3. Write yes or no to indicate whether the equation shown is equivalent to the equation $\frac{a}{b} = \frac{5}{8}$

   a. $\frac{a}{5} = \frac{b}{8}$ b. $\frac{b}{a} = \frac{13}{5}$

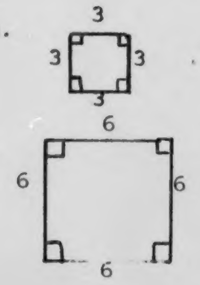
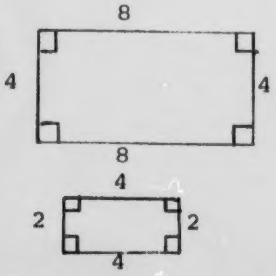
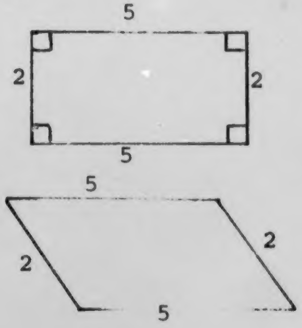
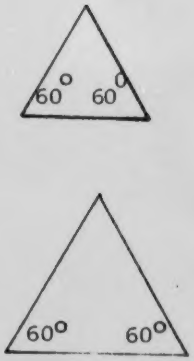
   c. $a \cdot 8 = b \cdot 5$ d. $\frac{a + b}{b} = \frac{5 + 8}{5}$

   e. $a \cdot b = 5 \cdot 8$ f. $\frac{8}{5} = \frac{b}{a}$

Course or Grade Geometry

Concept: Similar Polygons

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. State and apply the properties of similar polygons.		4. State why the polygons are, or are not, similar. a.  b.  c.  d. 

Course or Grade Geometry

Concept: Similar Polygons

Objective: At the conclusion of the second unit on similar polygons, students will demonstrate a knowledge similar triangles. They will be able to:

LEARNER OUTCOMES

1. Apply the theorem, AA Postulate and corollaries to determine if two triangles are similar.

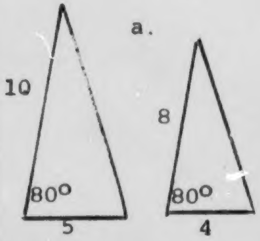
2. Apply the theorem: If a line is parallel to one side of a triangle and intersects the other two sides, it divides them proportionally.

MATERIALS/METHODS

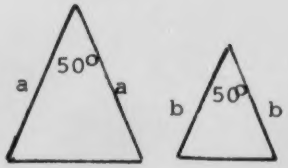
EVALUATION

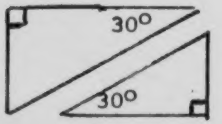
1. Determine if the pairs of triangles are similar, and if so, what theorem, postulate or corollary supports the similarity.

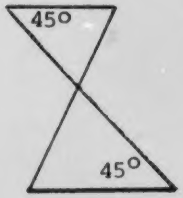
a.



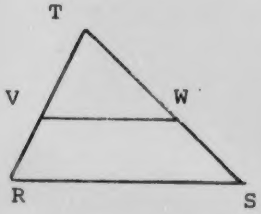
b.







2. $\overline{VW}$ $\overline{RS}$.



a. ∠ TVW ≅ ∠ ?

b. $\frac{?}{VR} = \frac{TW}{WS}$

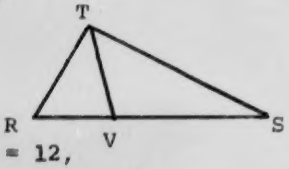
c. If TV = 6, VR = 4, and TW = 9, then WS = ?

d. If TR = 18, VR = 6, and TS = 27, then WS = ?

Course or Grade Geometry

Concept: Similar Polygons

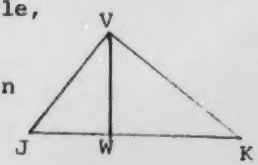
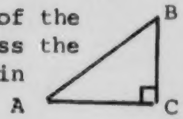
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
3. Apply the theorem: If a ray bisects and angle of a triangle, it divides the opposite side into segments whose lengths are proportional to the lengths of the other two sides.		3. In the figure, $\overrightarrow{TV}$ bisects $\angle RTS$.  a. $\frac{RV}{VS} = \frac{?}{TS}$ b. If RT = 6, TS = 12, and RV = 4, then VS = ? c. If $\frac{RT}{TS} = \frac{1}{2}$ and RS = 30, then RV = ?

Course or Grade Geometry

Concept: Right Triangles

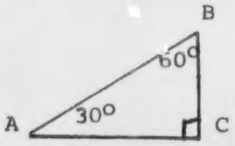
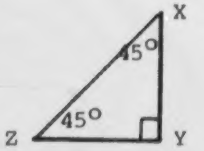
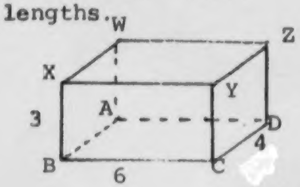
Objective: At the conclusion of the first unit on right triangles, students will demonstrate a knowledge of the Pythagorean Theorem. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Determine the geometric mean between two numbers.	Precede the chapter with a review of radicals and their properties. A worksheet over simplification of radicals is desirable. It is a suitable time to teach (or reteach) the extraction of square roots. The filmstrip *Computing Square Roots* shows the division-average method. A handout with steps for the traditional method of finding square root would be suitable. It is a good time to work with students on the use of the hand held calculator in taking square root. Do not use the calculator until students can compute first.	1. Express in simplified form, the geometric mean between: a. 4 and 9 b. 6 and 8 c. 3 and 11
2. Apply the relationships that exist when the altitude is drawn to the hypotenuse of a right triangle.		2. ∠ JVK is a right angle, and $\overline{VW} \perp \overline{JK}$.  a. If m∠ J = 70, then m∠ JVW = ? b. If m∠ J = 70, then m∠ K = ? c. JVK ? ? d. JV is the geometric mean between JK and ? e. If VK = 13 and WK = 12, then JK = ?
3. Apply the Pythagorean Theorem and its converse.	Transparency with overlays, "Euclid's Proof of the Pythagorean Theorem." Discuss other proofs of the Pythagorean Theorem. Extra credit for a paper about Pythagoras or related topics. Discuss Pythagorean triples and for interested students, Pythagorean quadruples.	3. The lengths of two sides of the triangle are given. Express the length of the third side in simplified radical form.  a. AC = 6; BC = 8; AB = ? b. AC = 4; AB = 5; BC = ? c BC = 5; AB = 6; AC = ?

Course or Grade Geometry

Concept: Right Triangles

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Determine the lengths of two sides of a 45°-45°-90° or 30°-60°-90° triangle when the length of the third side is given.	Some students may know about the application in construction work of the 45°-45°-90° triangle. Before starting on a foundation, some bricklayers check a corner angle by measuring 7 feet out from the corner stake in the directions planned for two walls. The two new points should lack an inch of being 10 feet apart. For greater precision, the bricklayers could use the measurements 10', 10', and 14' 1 3/4".	4. Exercises a--f refer to the 30°-60°-90° triangle shown.  a. AB = 14; BC = ? b. BC = 9; AB = ? c. BC = 6; AC = ? d. AB = 16; AC = ? e. AC = $8\sqrt{3}$; BC = ? f. AC = $4\sqrt{3}$; AB = ? Exercises g,h,i refer to the figure shown.  g. XY = 7; XZ = ? h. YZ = 10; XZ = ? i. XZ = 10; XY = ?
5. Apply the Pythagorean Theorem in working with a rectangular solid.	Use plastic models of rectangular solids, including the cube. Use transparency with overlays, The Cube.	5. Refer to the rectangular solid shown. Find the indicated lengths.  a. AB b. WZ c. AW d. WX e. CZ f. AC g. WC h. BC

Course or Grade Geometry

Concept: Right Triangles

Objective: At the conclusion of the second unit on right triangles, students will demonstrate a knowledge of the sine, cosine and tangent functions of trigonometry. They will be able to:

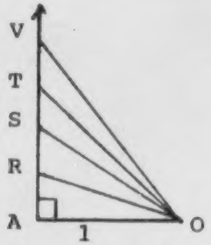
LEARNER OUTCOMES

1. Use the definitions of tangent, sine, and cosine ratios to express the tangent, sine, and cosine of an acute angle of a right triangle.
2. Solve a right triangle by the correct selection and use of the tangent, sine, and cosine ratios.

MATERIALS/METHODS

The trigonometry in this course is limited to right triangle trigonometry and uses only the basic functions tan, sin, cos. Circular functions are not introduced. If students ask about functions of obtuse angles say that the definitions are best given with reference to coordinate axes.

A large chalkboard figure to show how tan x varies with x will let students intuitively sense that there is no upper bound to the values of the tan function.

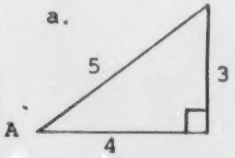


After students can successfully use a trig table, teach them how to use the trig functions on a hand-held calculator.

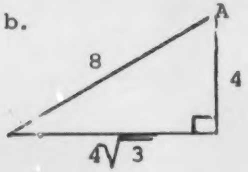
EVALUATION

1. State the values of sin A, cos A, and tan A as fractions in reduced and simplified radical form.

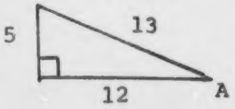
a.

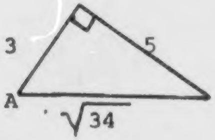


b.



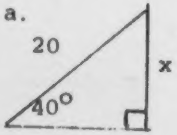
c.



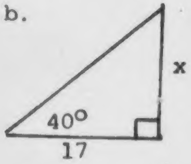


2. Find x correct to two digits.

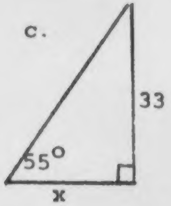
a.



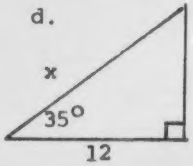
b.



c.



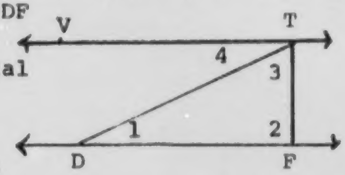
d.



Course or Grade: Geometry

Concept: Right Triangles

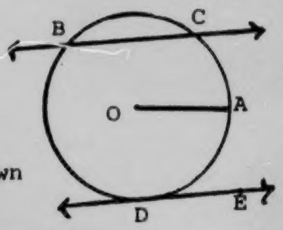
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
3. Recognize an angle of elevation and an angle of depression.	Transparency with overlays titled "The Tangent." Transparency with overlays titled "The Sine."	3. Points D,F,V, and T lie in a vertical plane. Line DF and line VT are horizontal lines.  a. When a person at D sights point T, the angle of elevation is ? b. When a person at T sights point D, the angle of depression is ?
4. Apply right triangle trigonometry to problems.		4. a. A kite string is 200 meters long. Find the height of the kite if the string does not sag and makes an angle of 38° with the ground. b. The pilot of an airplane finds the angle of depression of an airport to be 16°. If the altitude of the plane is 6000 meters, find the horizontal distance to the airport.

Course or Grade Geometry

Concept: Circles

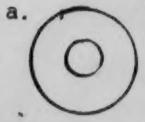
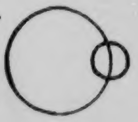
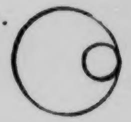
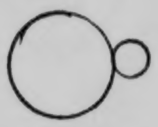
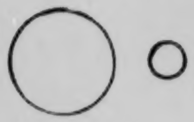
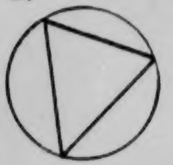
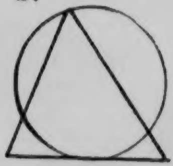
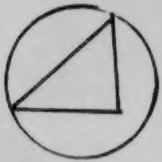
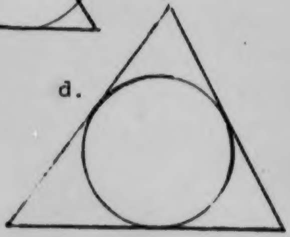
Objective: At the conclusion of the first unit on circles, students will demonstrate a knowledge of tangents, arcs and chords. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Recognize the definitions of lines and segments related to circles.	Transparency with overlays, "Tangents to a Circle." Filmstrip, Tangents to a Circle. Transparency with overlays, "Lines in a Circle." Transparency with overlays, "Inequalities of Chords."	1. Match the definition with the correct word. ___diameter ___radius ___secant ___chord ___tangent a. segment that joins the center of a circle to a point on the circle. b. segment whose enpoints lie on a circle c. a line that contains a chord d. chord that contains the center.
2. Identify from a given drawing a center, radius, chord, secant, tangent, diameter.		2. Some lines and segments associated with circle O as shown.  a. A radius shown is ? b. A tangent that is shown is ? c. A chord that is shown is ? d. A secant that is shown is ? e. Suppose $\overrightarrow{AO}$ is extended until it intersects the circle at X. Then $\overline{AX}$ is called a ___ of the circle.

Course or Grade Geometry

Concept: Circles

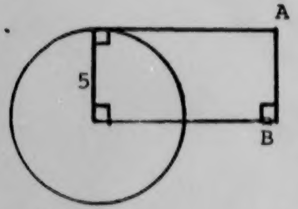
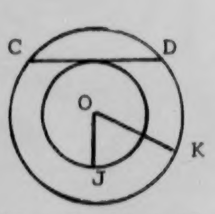
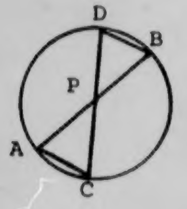
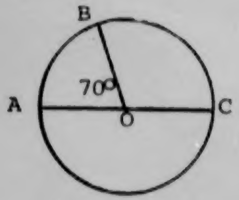
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
3. Draw with geometer or compass and straight edge figures using two circles showing 0, 1, 2, 3 or 4 externald and/or internal tangents.		3. For each pair of coplanar circles, draw the common internal tangents and the common external tangents. a.  b.  c.  d.  e. 
4. Recognize polygons inscribed in or circumscribed about circles.		4. State whether the triangle is inscribed in the circle or circumscribed about the circle or neither. a.  b.  c.  d. 

Course or Grade Geometry

Concept: Circles

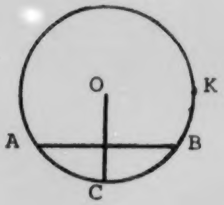
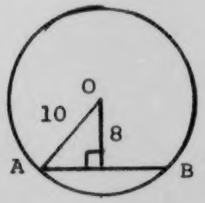
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
5. Apply the theorems that relate tangents and radii.	Students should know the statements of the theorems in order to use them in proofs.	5. Prove that the lines tangent to a circle at the endpoints of a diameter are parallel. Using the following figures, find the requested length.  Find AB.  OJ = 9; OK = 15. Find CD.
6. Use, in exercises and proofs, the properties involving arcs and central angles.		6. Proof. Given: $\overline{AB}$, $\overline{CD}$ are diameters. Prove: $\overset{\frown}{AD} \cong \overset{\frown}{BC}$  Exercise.  m $\overset{\frown}{AB}$ = ? m $\overset{\frown}{BC}$ = ?

Course or Grade Geometry

Concept: Circles

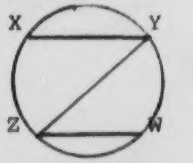
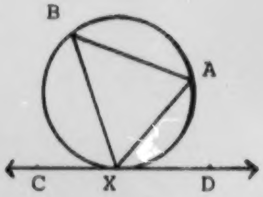
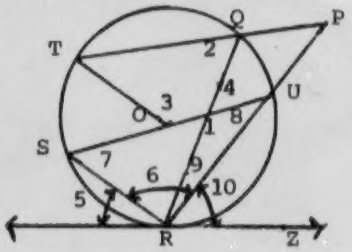
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
7. Apply the theorems about chords of a circle.		7. Proof. Given: Circle O; $\overline{OC} \perp \overline{AB}$; $\overset{\frown}{KB} \cong \overset{\frown}{AC}$ Prove: $\overset{\frown}{KB} \cong \overset{\frown}{BC}$  Exercise. Find AB. 

Course or Grade Geometry

Concept: Circles

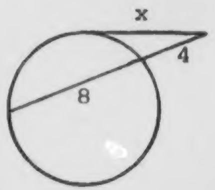
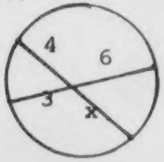
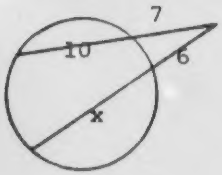
Objective: At the conclusion of the second unit on circles, students will demonstrate a knowledge of angles and segments. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Solve problems and prove statements involving inscribed angles and angles formed by a secant ray and a tangent ray.	Statements of theorems and corollaries should be learned. Use transparency with overlays titled "Angle Measurement."	1. Proof. Given: $\overline{XY} \parallel \overline{ZW}$ Prove: $\overset{\frown}{XZ} \cong \overset{\frown}{YW}$  Problem. m $\angle$ AXD = 50, m $\angle$ A = 60. Find m $\angle$ BXA. Find m $\angle$ B. 
2. Solve problems involving angles formed by secants and tangents.		2. Given a figure with arc RS = 80°, arc ST = 44°, arc QU = 32°, find the measures of all numbered angles. Line RZ is a tangent. O is the center.  T Q P 2 4 U O 3 1 8 S 7 6 9 10 5 R Z

Course or Grade Geometry

Concept: Circles

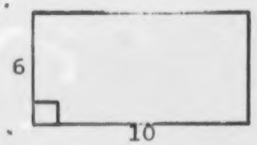
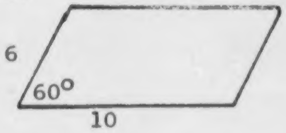
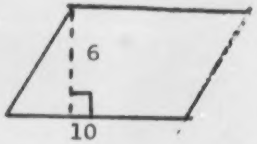
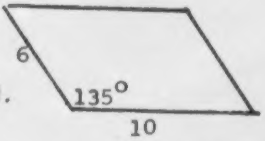
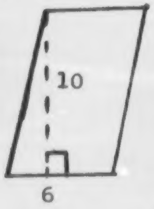
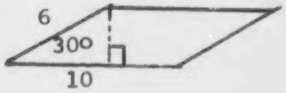
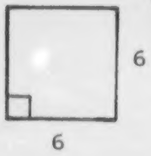
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
3. Solve problems involving lengths of chords, secant segments, tangent segments.		3. Find x. a.  b.  c. 

Course or Grade Geometry

Concept: Areas and Volumes

Objective: At the conclusion of the first unit on areas and volumes, students will demonstrate a knowledge of areas of polygons. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find the areas of rectangles, squares and parallelograms.	Use plastic models of parallelograms on the overhead projector to illustrate base and altitude. Transparency with overlays, "Venn Diagram: Polygons." Transparency with overlays, "Venn Diagram: Triangles." Transparency with overlays, " Areas of Triangles." Frequent quizzes on the formulas for areas. Geo-Tac-Toe Game I for areas and perimeters Geo-Tac-Toe Game II for volumes and surface areas.	1. State the area of the parallelogram pictured. a.  b.  c.  d.  e.  f.  g. 

Course or Grade Geometry

Concept: Areas and Volumes

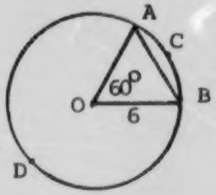
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
2. Compute the areas of triangles, rhombuses, and trapezoids.		2. Find the area of each of the following: a. a triangle with base 8 and altitude 5. b. a rhombus with diagonals whose lengths are 8 and 12. c. a right triangle with legs 12 and 13. d. an equilateral triangle with perimeter 24 cm. e. a trapezoid with bases 12 cm and 7 cm long and an altitude of length 5 cm.
3. Compute the apothem, radius and area of special regular polygons.	Show transparency with a regular polygon inscribed in a circle and also circumscribed in a circle to illustrate apothem and radius of the regular polygon.	3. a. Find the apothem, radius and area of a square of side 8, an equilateral triangle of side 12 and a regular hexagon of side 8. b. Find the side, radius and area of a square of apothem 3, an equilateral triangle of apothem 4 and a regular hexagon of apothem 4.

Course or Grade Geometry

Concept: Areas and Volumes

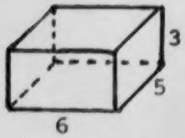
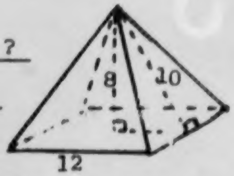
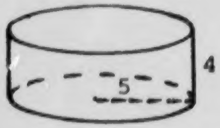
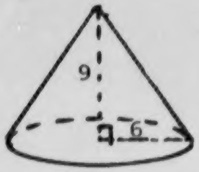
Objective: At the conclusion of the second unit on areas and volumes, student will demonstrate a knowledge of measuring circles. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Compute the circumferences and areas of circles.	Discuss the history of pi. A bulletin board with poster showing the value of pi to several thousand places, and student prepared papers about pi as well as Biblical references to the value of pi could be done. A model of a circle with sectors cut can be taken apart and fit together again to show the area as a parallelogram.	1. The radius of a circle is 3. a. Using π rather than an approximation, write an expression for the circumference of the circle. b. Compute the circumference correct to tenths. c. Using π rather than an approximation, write an expression for the area of the circle. d. Compute the area correct to tenths.
2. Compute arc lengths and the areas of sectors and segments of a circle.		2. Given circle O with radius 6 and $m\angle AOB = 60$. a. Length of ACB = ? b. Length of ADB = ? c. Area of sector with arc ACB = ? d. Area of sector with arc ADB = ? e. Area of segment ACB = ? 

Course or Grade Geometry

Concept: Areas and Volumes

Objective: At the conclusion of the third unit on areas and volumes, students will demonstrate a knowledge of solids. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Compute the lateral area, total area, and volume of a right prism or pyramid.	Use plastic models of prisms, pyramids, cylinders, cones. Quizzes on the formulas should precede a unit or chapter test.	1. A rectangular solid has the dimensions shown. a. Lateral area = ? b. Total area = ? c. Volume = ?  The altitude and a slant height of a regular square pyramid are pictured. a. Lateral area = ? b. Total area = ? c. Volume = ? 
2. Compute the lateral area, total area, and volume of a right circular cylinder or cone.		2. Refer to the right circular cylinder shown. a. Lateral area = ? b. Total area = ? c. Volume = ?  A cone has a radius of 6 cm and an altitude of 9 cm. a. Lateral area = ? b. Total area = ? c. Volume = ? 

Course or Grade Geometry

Concept: Constructions and Loci

Objective: At the conclusion of the first unit of constructions and loci, students will demonstrate a knowledge of constructions. They will be able to:

LEARNER OUTCOMES

1. Perform the fifteen basic constructions.
2. Apply the basic constructions in original construction exercises.

MATERIALS/METHODS

Show some notebooks prepared by students from preceding classes.

Discuss possible and impossible constructions. Some student may try to trisect a general angle, although angle trisection is impossible.

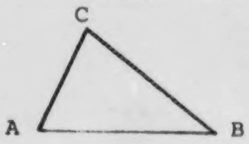
Transparency with worksheet from Milliken, "Constructions."

Transparency with overlays, " Triangle Construction Problem."

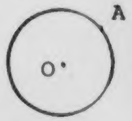
Transparency with overlays, "Construction Problem Involving Proportions."

EVALUATION

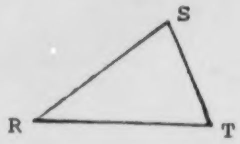
1. Prepare a notebook with the fifteen basic constructions. Each construction will consist of the following six parts.
   a. A statement of the required construction
   b. A statement, in terms of a figure, of what is given
   c. A statement of what is to be constructed
   d. The Construction (figure)
   e. An Explanation of the construction
   f. A Justification of the construction
2. Draw a figure similar to, but larger than, the one shown. Do the indicated construction.
   a. An altitude from C



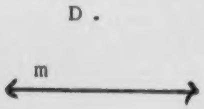
   b. A tangent to circle O at A



   c. A bisector of $\overline{RT}$.



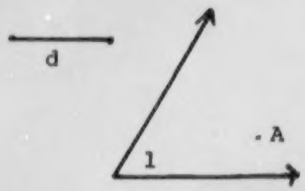
   d. A line through D parallel to m.



Course or Grade Geometry

Concept: Constructions and Loci

Objective: At the conclusion of the second unit on constructions and loci, students will demonstrate a knowledge of loci. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Describe the locus that satisfies a given condition.	Filmstrip, Introducing Locus. Transparency with overlays, "Construction of Circles and Tangents." Transparency with overlays, "Cycloid."	1. Line k lies in plane S. The locus of points that lie in S and are 4 cm from k is a. a pair of points. b. a circle. c. a line. d. a pair of lines.
2. Describe the locus that satisfies more than one given condition.		2. In plane Z, lines g and h intersect in point A. The locus of points that lie in Z, are equidistant from g and h, and are 5 cm from A is a. a set of four points. b. a point. c. a circle. d. the empty set.
3. Apply the concept of locus in the solution of a construction exercise.		3. Given: a segment with length d; point A in the interior of ∠ 1. Locate by construction each point (label each point X) that lies in the interior of ∠ 1, is equidistant from the sides of ∠ 1, and is d units from A. 

Course or Grade Geometry

Concept: Coordinate Geometry

Objective: At the conclusion of the first unit on coordinate geometry, students will demonstrate a knowledge of the coordinate plane. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Specify points in the coordinate plane by means of their coordinates.	Milliken transparency with worksheet, "Geometry with Coordinates." Transparency with overlays, "Coordinate Geometry--A Standard Theorem." Transparency with overlays, "Coordinate Geometry Applied to a Circle."	1. Graph the following points on one set of axes using graph paper: A(1,1); B(-3,0), C(-4,-1); D(3,-2).
2. Represent vertical and horizontal lines in the coordinate plane by means of equations.		2. Using graph paper graph the following lines on one set of axes: a. line m with equation $x = 5$ b. line n with equation $y = 2$ c. line p with equation $x = -2$ d. line r with equation $y = -3/2$
3. Represent coordinates as points in the plane.		3. Using exercise 2 above, give the coordinates of the intersection of the following lines. a. m and n b. n and p c. m and r d. p and r
4. State and apply the distance formula.	Show how the Pythagorean Theorem can be used to arrive at the distance formula.	4. Find the distance between the given points. Express answers in simplest radical form. a. (0,0) and (5,10) b. (-2,-4) and (3,8) c. (5,0) and (0,5) d. (a,b) and (c,d)

Course or Grade Geometry

Concept: Coordinate Geometry

Objective: At the conclusion of the second unit on coordinate geometry, students will demonstrate a knowledge of segments and lines. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use the midpoint formula to find the coordinates of the midpoint or endpoint of a segment.		1. Use the midpoint formula to find the midpoint of the segment joining the given points. a. (2,2) and (2,4) b. (4,-6) and (0,0) c. (-1,2½) and (-3,3½) Given the midpoint M(2,3) and endpoint E_1(5,-1) find the other endpoint E_2.
2. Find the slope of the line containing two given points.		2. Find the slope of the line containing the points named. If the line has no slope, write "Slope not defined." a. (5,2) and (2,8) b. (3,4) and (3,-7) c. (-8,0) and (-2,9) d. (a,b) and (c,d)
3. Determine whether two lines are parallel, perpendicular, or neither.		3. Determine which sides, if any, of quadrilateral ABCD are parallel or perpendicular. a. A(0,0); B(6,-2); C(7,1); D(1,3) b. A(0,-4); B(2,-3); C(1,-1); D(-2,0) c. A(-3,-1); B(3,1); C(1,3); D(-2,2)

Course or Grade Geometry

Concept: Coordinate Geometry

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Graph the line specified by a given equation.	Filmstrip, *Finding Equations of Lines*.	4. On graph paper plot the graph of each equation. a. $2x + y = 4$ b. $y = x - 1$ c. $y + 1 = \frac{1}{2}x$
5. Write an equation of a line when given either two points on the line or one point and the slope of the line.		5. Write the equation of the line containing the given points. a. (2,1) and (6,5) b. (-1,-3) and (2,1) Write the equation of the line passing through Point P and having slope m. c. P(5,-1); $m = -\frac{1}{2}$ d. P(-1,-3); $m = 2/3$ e. P(-1,2): $m = 0$
6. Use an algebraic method to determine the intersection of two lines.	Review systems of simultaneous linear equations.	6. Find the intersection of the given lines algebraically. a. $x + y = 1$; $x - y = 5$ b. $3x - y = 7$; $5x + 3y = 35$ c. $4x + y = 7$; $x = a$

GOALS OF ALGEBRA II

Students in Algebra II will:

1. Review and extend their understanding and mechanics of Algebra I.
2. Further develop their ability to translate English sentences (word problems) into mathematical sentences and solve them.
3. Extend their understanding and abilities to solve some of the more complicated and different factoring problems as well as systems of equations including quadratics both by graphing and mathematical means.
4. Be able to solve certain exponential equations by the use of logarithms.

Algebra II evaluation:

1. Grades from daily homework assignments
2. Unit tests.
3. Quizzes over day-to-day concepts.
4. Chapter tests.
5. Nine week tests.
6. Semester tests.

Course or Grade: Algebra II

Concept: Set Theory

Objective: At the conclusion of this unit, students will demonstrate a knowledge of elements, notation of sets, and the basic axioms of algebra. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Specify by roster the elements of a set when given a rule or condition and vice versa.	Lecturing, questioning, discussion, chalkboard, textbook, and/or overhead.	1. a. Give the whole numbers as a roster. b. Give $\{1,2,3,\ldots\}$ as a rule.
2. Determine if two given sets are equivalent or equal and if they can be place in 1-1 correspondence.		2. Which of the following are true of $\{5,3,2\}$ and $\{5,3,1\}$? a. equal b. equivalent
3. Determine if a given set is finite or infinite.		3. Classify as finite or infinite. a. {trees in U.S.A.} b. {whole numbers}
4. Recognize when a condition specifies an empty or null set.		4. Give solution set of: {integers between ½ and 3/4}.
5. Recognize when a set is a subset of a given set and if the subset is a proper subset.		5. Explain the difference between a proper subset and an improper subset.
6. Read and write mathematical statements using set notation and symbols.		6. Write an English sentence stating the following: $2 \in \{0,1,2,3\}$.
7. Explain and identify terms and expressions such as variable, domain, constant, solution set, open sentence, and root or solution of an open sentence.		7. Explain what is meant by the terms variable, domain, constant, open sentence, root or solution, and solution set.

Course or Grade: Algebra II

Concept: Set Theory

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
8. List the elements of a solution set for an open sentence when the domain or universe is given.		8. Determine the solution set over the given set: $x + 5 = 7$; $\{1,2,3,4\}$
9. Give union and intersection of various sets using the proper symbols.		9. Give a. the union and b. the intersection of $\{3,6,9,12\}$; $\{2,4,6,8\}$
10. Use Venn (Euler) diagrams to show relationships among various sets.		10. Use a Venn diagram to show relationships of the above two sets.
11. Show an interpretation of the Comparison Axiom using inequality symbols and also on the number line.		11. Graph 2 and -2 on a number line and use $>$, $<$, or $=$ to give a comparison fo these numbers.
12. State the Closure Axiom for addition and multiplication of real numbers and determine if a given set is closed under a given operation.		12. Is $\{-1,0,1\}$ closed with respect to multiplication?
13. Identify examples of the use of the Axioms of Equality.		13. Match: a. reflexive 1. If $a=b$, then $b=a$. b. symmetric 2. $a=a$ c. transitive 3. If $a=b$ and $b=c$, then $a=c$.
14. Justify operations on real numbers by the Commutative and Associative Axioms of addition and multiplication.		14. Give axioms for the following: a. $(2 + 3) + 5 = 2 + (3 + 5)$ b. $5(2 + 3) = (2 + 3)5$

Course or Grade: Algebra II

Concept: Set Theory

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
15. Use and recognize the use of the identity elements for addition and multiplication and the additive and multiplicative inverses in operations on real numbers.		15. Give axioms for the following: a. $5 + (-5) = 0$ b. $\frac{2}{3} \cdot \frac{3}{2} = 1$ c. $0 + (-7) = -7$ d. $1(-7) = -7$
16. Define and give the absolute value of given numbers and algebraic expressions and determine solution sets of equations and inequalities containing absolute value notation.		16. Give the absolute value or solution set as indicated: a. $\|7\| + \|-7\|$ b. $\|x\| = 6$ c. $\|q\| > 1$; real numbers
17. Give the axiom, theorem, or definition justifying each step in a proof.		17. Give a mathematical reason for each step. Prove: If $a = b$ and $c = b$, then $a = c$. Proof $a = b$ and $c = b$ a. __________ $b = c$ b. __________ $\therefore a = c$ c. __________

Course or Grade: Algebra II

Concept: Open Sentences in One Variable

Objective: At the conclusion of this unit, students will demonstrate a knowledge of open sentences in one variable as well as polynomials. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Classify certain polynomials as to type and degree.		1. Give the degree of each polynomial and classify as to monomial, binomial, or trinomial. a. x b. $x^2 - 2y^2x$ c. $30 + 7x - y$
2. Identify the power, base, and numerical coefficient of a given expression.		2. Identify the power, base and numerical coefficient of cx^2.
3. Simplify a polynomial and express it in either decreasing or increasing degree of a given variable.		3. Simplify and arrange in decreasing degree. $(5x^3 + 7x^2 - 3x + 1) + (3x^3 + 5x - 18)$
4. Solve equations and inequalities by using the transformation properties.		4. Solve. a. $2(3y + 5) - 12 = 3y - 8$ b. $3x + 5 \geq x - 1$ c. $\|x - 1\| \leq 3$ and graph.

Course or Grade: Algebra II

Concept: Linear Open Sentences

Objective: At the conclusion of this unit, students will demonstrate a knowledge of graphing and finding solution sets of open sentences in two variables. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Recognize basic graph terminology as axes, origin, coordinates, abscissa, ordinate, ordered pair, graph, coordinate plane, first and second component, quadrant.	Chalkboard, textbook, and/or overhead.	1. Match the following. a. (3,1) ___Quadrant I b. (4,-2) ___Quadrant II c. (-5,-3) ___Quadrant III d. (-3,2) ___Quadrant IV
2. Find solution sets of open sentences in two variables with given replacement sets for the variables.	Solve for y in terms of x and use an x-y chart.	2. Find the ordered pairs (x,y) that satisfy $4x + 2y = 6$ if $x \in \{-6,0,12\}$.
3. Graph linear equations in two variables.	Demonstrate an x-y chart for a problem such as $4x + 3y = 12$	3. Graph $4x + 3y = 12$.

Course or Grade: Algebra II

Concept: Linear Open Sentences

Objective: At the conclusion of this unit, students will demonstrate a knowledge of the slope of a line and finding an equation of a line. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use the definition of slope to find the slope of a line given two points on the line.	Filmstrip, Equations of Lines	1. Given: $4x + 3y = 12$ with $(0,4)$ and $(3,0)$ on the line. Find the slope.
2. Use the theorem that the slope of the graph of a linear equation $Ax + By = C$ $(B \neq 0)$ is $-\frac{A}{B}$.		2. Find the slope of the graph of $7x - 2y = 8$ without solving for y.
3. Show and use the fact that the slope of a line is the coefficient of x when its equation is solved for y ($y = mx + b$ where m is the slope and b the y intercept).		3. Find the slope m of the line with equation $7x - 2y = 8$
4. Use the point-slope form of the equation of a line ($y - y_1 = m(x - x_1)$).		4. a. Give the equation in standard form of the line passing through the points $(-3,5)$ and $(6,-4)$. b. Given an equation of the line having slope 4 and containing $(0,2)$.

Course or Grade: Algebra II

Concept: Linear Open Sentences

Objective: At the conclusion of this unit, students will demonstrate a knowledge of systems of linear equations and inequalities in two and three variables. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Classify the graphs of two linear equations in two variables.	FS/ 171-172 Systems of Linear Equations	1. Match. a. consistent and independent b. inconsistent and independent c. consistent and dependent ___parallel lines ___intersecting lines ___the same line
2. Graph the solution sets of systems of linear inequalities in two variables.		2. Graph the solution set of the system: $2x + y > 1$ $x - y \leq 3$
3. Solve linear systems in two variables.		3. Solve the following using either the linear-combination **or** substitution method. $3x + y = 16$ $2x + 3y = -7$
4. Use pairs of linear equations in two variables to solve word problems.		4. Solve using a system of equations. Last summer Fred earned $16 a day and Marie earned $18 a day. Together they earned a total of $1780. How much did each earn, if Fred worked 5 days longer than Marie?
5. Solve systems of three linear equations in three variables.		5. Solve: $a + 2b - c = 3$ $2a - b + c = 3$ $3a - 4b + 2c = -1$

Course or Grade: Algebra II

Concept: Functions and Polynomials

Objective: At the conclusion of this unit, students will demonstrate a knowledge of relations, functions, direct variation, and proportion. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify the terms used with relations and functions.	TC 122-126, Second-year algebra tapes (Relations, functions)	1. Match with best answers. a. relation ___ $\{(3,5),(4,-2)\}$ b. function ___ $\{(3,5),(3,-7)\}$ c. ordered pair ___ $(3,5)$ d. domain ___ set of second components e. range ___ set of first components
2. Graph relations and determine if they are functions.		2. Graph the relation $\{(x,x^2): x \in \{-2,-1,1,2\}\}$ and determine by inspection if the relation is a function. (Does a vertical line cut the graph of the relation in no more than one point?)
3. Evaluate a function for a given element of the domain.		3. Evaluate $g(x) = \frac{1}{2}x + 3$ for $g(-4)$.
4. Identify terms used in direct variation and proportion.		4. Match. Given $y = mx$ and $m \neq 0$. a. $y = mx$ ___ extremes b. m ___ proportion c. $\frac{y_1}{x_1} = \frac{y_2}{x_2}$ ___ direct variation d. y_1 and x_2 ___ means e. x_1 and y_2 ___ constant of proportionality
5. Solve word problems using a proportion.		5. A real estate agent makes a commission of $2100 on a sale of $35,000. At the same rate, what would be the commission on a sale of $46,000?

Course or Grade: Algebra II

Concept: Functions and Polynomials

Objective: At the conclusion of this unit, students will demonstrate a knowledge of polynomial computation. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use the law of exponents to multiply a polynomial by a monomial		1. Simplify. a. $(-5ab^4)(-3a^2b)^3$ b. $y^{3n}(y^{n+1} - 3y^n + 4)$
2. Simplify polynomial products by using the general and special product formulas.		2. Match. a. $(a+b)^2$ ___ a^2-b^2 b. $(a-b)^2$ ___ a^3+b^3 c. $(a+b)(a-b)$ ___ $a^2+2ab+b^2$ d. $(a+b)(a^2-ab+b^2)$ ___ a^3-b^3 e. $(a-b)(a^2+ab+b^2)$ ___ $a^2-2ab+b^2$
3. Simplify quotients of monomials and of one polynomial divided by another of lower degree.		3. Assuming no denominator is 0, simplify. a. $\frac{9x^4y^2}{12x^2y^2}$ b. $\frac{3c^2d^2 + 2cd^2 - c^2d}{cd}$ c. $\frac{4x^3 + 8x^2 - x}{x + 2}$

Course or Grade: Algebra II

Concept: Factoring Polynomials

Objective: At the conclusion of this unit, students will demonstrate a knowledge of factoring polynomials. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use prime factorization to give the greatest common factor and the least common multiple of two or more integers.		1. Find the GCF and LCM of 315 and 540.
2. Factor quadratic polynomials that are not special cases.	TC86 Factoring: Complete Trinomials.	2. Factor completely. a. $6a^3 + 7a^2 + 2a$ b. $2ax + 3 + x + 6a$
3. Factor special kinds of polynomials such as perfect trinomial squares, difference of squares, and sum or difference of cubes.	TC87 Factoring: General Trinomials.	3. Factor completely. a. $a^2 + 2ab + b^2$ b. $a^2 - 2ab + b^2$ c. $a^2 - b^2$ d. $a^3 + b^3$ e $a^3 - b^3$

Course or Grade: Algebra II

Concept: Factoring Polynomials

Objective: At the conclusion of this unit, students will demonstrate a knowledge of solving and applying polynomial equations and inequalities by factoring. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Apply the zero-product property to solve polynomial equations.		1. Solve. a. $(t+1)(t-3)=0$ b. $15x^2 = 35x - 10$ c. $x^2 + 13bx = 48b^2$ (for x)
2. Use polynomial equations to solve problems.		2. A gardener cuts a rectangular park lawn in a uniform strip around the edges until one third of the grass remains uncut. If the lawn measures 40 meters by 60 meters, how wide is the strip?
3. Use factoring to solve inequalities.		3. Graph the solution set of $x^2 > -7x - 10$ over the set of real numbers.

Course or Grade: Algebra II

Concept: Rational Expressions

Objective: At the conclusion of this unit, students will demonstrate a knowledge of the rules of exponents and scientific notation. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use rules of exponents to simplify expressions.		1. Simplify using positive exponents. a. $\frac{a^{-2}b^3}{a^3b^{-2}} \cdot b^0$ b. $\left(\frac{6ab^{-2}}{2ab^3}\right)^3$
2. Write, multiply and divide numbers in scientific notation.		2. a. Write 143.6 in scientific notation. b. Give the following in decimal form. $\frac{(15 \times 10^4)(8 \times 10^3)}{(20 \times 10^{-2})(3 \times 10^8)}$

Course or Grade: Algebra II

Concept: Rational Expressions

Objective: At the conclusion of this unit, students will demonstrate a knowledge of computation with rational expressions and practical applications. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Write algebraic expressions in lowest terms including their products and quotients and complex fractions.		1. Write in lowest terms. a. $\frac{x^2 - 9}{x^2 + x - 6}$ b. $\frac{x^2 - 1}{2x + 1} \cdot \frac{4x^2 + 4x + 1}{x^2 + 2x + 1}$ c. $\frac{x^2 - 4x}{x^2 + 2x} \div \frac{x^2 - 9x + 20}{x^2 - 3x - 10}$ d. $\frac{\frac{ax}{b}}{\frac{b^2}{a^2x^2}}$
2. Simplify sums and differences of rational algebraic expressions.		2. Simplify. a. $\frac{1}{6} + \frac{2}{15} - \frac{1}{30}$ b. $\frac{xy}{x^2 - y^2} + \frac{x}{x - y}$ c. $\frac{x}{x^2 - 9x + 18} + \frac{x - 2}{x^2 - 10x + 24}$

Course or Grade: Algebra II

Concept: Rational Expressions

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
3. Solve open sentences involving rational coefficients.		1. Solve. a. $\frac{x^2}{3} - \frac{x}{2} - \frac{1}{3} = 0$ b. $.01x - .01y - .73 = 0$ $.02x + .07y - .29 = 0$ c. Graph $\frac{x}{3} - 2 < \frac{x + 1}{4}$
4. Solve fractional equations.		4. Solve and check the roots. $\frac{12}{y^2 - 4} - \frac{3}{y - 2} + 1 = 0$
5. Use fractional equations to solve word problems.		5. An air conditioner lowers the temperature in a room 15 degrees in 24 minutes. With a second unit in operation, the same change takes place in 6 minutes. How long would it take the second unit operating alone to make the same temperature change?

Course or Grade: Algebra II

Concept: Radicals and Irrational Numbers

Objective: At the conclusion of this unit, students will demonstrate a knowledge of simplification of radicals and decimal representation of rationals and irrationals. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use rules of radicals to find values and solve problems.	TC112-117 Second year Algebra tapes (Radicals)	1. Simplify. a. $\sqrt{\frac{81}{25 \cdot 16}}$ b. $\sqrt[3]{64}$ $\sqrt[3]{0.008}$ c. solve for x. $8x^3 = 27$ d. $\frac{\sqrt{30t}}{\sqrt{6t}}$ e. $\sqrt[3]{25r}$ $\sqrt[3]{5r^2}$ f. $\sqrt[3]{\frac{5}{9}}$ g. $\frac{1-\sqrt{3}}{1+\sqrt{3}}$ h. $\sqrt[3]{c\sqrt{c^3}}$, $c>0$ i. $\sqrt[3]{x^2y^6}$ (in exponential form)

Course or Grade: Algebra II

Concept: Radicals and Irrational Numbers

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
2. Recognize the characteristics of the decimal representation of real numbers.		2. State whether rational or irrational. a. $2.\overline{431}$ b. 2. 6565565556... Write as a terminating or repeating decimal. d. $-\frac{5}{16}$ e. $\frac{5}{7}$ Write as a common fraction on lowest terms. e. 0.315 f. $0.3\overline{64}$

Course or Grade: Algebra II

Concept: Quadratic Equations and Functions

Objective: At the conclusion of this unit, students will demonstrate a knowledge of quadratic equations and functions. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use the method of completing the square to solve a quadratic equation.		1. Solve $x^2 - 3x + 1 = 0$ by completing the square.
2. Develop the general quadratic formula.		2. Given an equation of the form $ax^2 + bx + c = 0$ use the method of completing the square to develop the quadratic formula, $x = \frac{-b \pm b^2 - 4ac}{2a}$
3. Solve quadratic equations by applying the quadratic formula.		3. Use the quadratic formula to solve the following: a. $x^2 + 5x = 5$ b. $8x = 1 - x^2$
4. Demonstrate ability to solve word problems that lead to quadratic equations.		4. The volume of a rectangular jewelry box 4 cm in height is 136 cubic centimeters. If the perimeter of the base is 24 cm, find the dimensions of the base.
5. Determine the nature of the roots of a quadratic equation using the discriminant.		5. Without solving the equation, determine the nature of its roots. a. $x^2 + 4x - 5 = 0$ b. $-3t^2 + 4t + 1 = 0$ c. $-5r^2 - r - 3 = 0$

Course or Grade: Algebra II

Concept: Quadratic Equations and Functions

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
6. Recognize how the roots and coefficients of a quadratic equation are related and give these specific relationships.		6. Give the sum and product of the roots of each equation. a. $x^2 + 3x - 12 = 0$ b. $6y^2 - 22 = 0$ State a quadratic equation whose roots have the given sum and product. c. $r_1 + r_2 = -8; r_1 r_2 = 5$ d. $r_1 + r_2 = \sqrt{2}; r_1 r_2 = 0$

Course or Grade: Algebra II

Concept: Quadratic Relations and Systems

Objective: At the conclusion of this unit, students will demonstrate a knowledge of quadratic relations and systems. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use the Pythagorean Theorem and the distance formula to find the distance between two point.		1. Find the distance between the points. a. (3,2), (3,6) b. (-6,3), (-2,-5)
2. Find the midpoint of a line segment by using the midpoint formula.		2. Give the midpoint of the line segment joining (1,-2) and (-5,3).
3. Put the equation of a circle in its general form and give the center and radius.		3. Find the center and the radius of the circle whose equation is $x^2 + y^2 - 8x + 2y - 3 = 0$
4. Write equations for parabolas using their geometric definition.		4. Find an equation of the parabola and graph it. a. focus: (1,0); directric: $x = -1$ b. vertex: (0,2); directric: $y = 1$.
5. Change the equation of a parabola into the special form to determine the vertex and axis of symmetry and draw the graph.		5. Find the vertex and draw the graph of $x + y^2 + 4y + 3 = 0$
6. Use the distance formula and the definition of an ellipse.		6. Give an equation of an ellipse with foci at (-4,0) and (4,0) and constant 10.

Course or Grade: Algebra II

Concept: Quadratic Relations and Systems

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
7. Transform the equation of an ellipse to its general form and draw the graph.		7. Draw the graph of $9x^2 + 4y^2 = 4$
8. Change the equation of a hyperbola to its general form and draw the graph by using asymptotes and symmetry.		8. Draw the graph of $x^2 - 9y^2 = 9$
9. Solve given systems involving a linear equation and a quadratic equation in two variables.		9. Find the solution set of the system: $y = x^2 - 4$ $y = x - 5$
10. Solve given systems involving two quadratic equations in two variables.		10. Give the solution set of: $x^2 + y^2 = 13$ $y = x^2 - 7$

Course or Grade: Algebra II

Concept: Exponential Functions and Logarithms

Objective: At the conclusion of this unit, students will demonstrate a knowledge of logarithms and their use in solving equations. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Change radical expressions to exponential form and use laws of exponents to simplify expressions.		1. Write in exponential form. a. $\sqrt[4]{xy^5}$ b. $3\sqrt[3]{8x^{-9}y^{-5}}$
2. Solve equations where the variable is in the exponent.		2. Solve. a. $t^{-\frac{3}{4}} = \frac{1}{8}$ b. $(x-1)^{2/3} = 25$
3. Change equations from exponential to logarithmic form.	TC106-111 Second Year Algebra Tapes (Logarithms) and/or Filmstrip on Logarithms.	3. Write in logarithmic form. $5^2 = 25$
4. Change equations from logarithmic to exponential form.		4. Write in exponential form. $\log_2 16 = 4$.
5. Solve given equations involving logarithms.		5. Solve. a. $\log 2 + \log 3 = \log n$ b. $\log_3 n - \log_3 4 = 2$
6. Determine the characteristic for the logarithm of a given number.		6. What is the characteristic of log 62.4?

Course or Grade: Algebra II

Concept: Exponential Functions and Logarithms

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
7. Find the mantissa of the logarithm from the log table.	Use logarithmic wall chart.	7. Find the mantissa of log 62.4 from the log table.
8. Determine the antilogarithm of a given logarithm.		8. Give the antilog of 9.603 - 10 from the log table.
9. Use the product and quotient properties of logarithms to do calculations.		9. Use logarithms to evaluate to three significant digits. a. $(4.76)(86.1)$ b. $\frac{80.7}{41.6}$
10. Use the powers and roots properties to raise given numbers to powers and to extract roots of given numbers.		10. Compute using logarithms and writing logarithmic equations. a. $(4.09)^3$ b. $\sqrt[4]{0.307}$
11. Use logarithms to solve equations.		11. Solve by use of logarithms. a. $4^n = 60$ b. $x^{\frac{1}{4}} = 7.06$ c. $x = \log_5 7$

GOALS OF TRIGONOMETRY

Students in Trigonometry will:

1. Understand the properties of periodic functions and their role in different areas of mathematics.
2. Recognize that the manipulative techniques involved in working with periodic functions depend upon fundamental properties of the functions.
3. Acquire facility in applying mathematical processes.
4. Appreciate the scope and depth of the study of functions.
5. Prepare for modern courses in calculus, vector analysis, complex variables, matrices and abstract algebra.
6. Perceive the unity of mathematics.

Trigonometry evaluation:

1. Grades from daily homework assignments.
2. Unit tests.
3. Frequent quizzes over basic identities.
4. Chapter tests and nine-week tests.
5. Semester examination.

Course or Grade Trigonometry

Concept: Cosine and Sine Functions

Objective: At the conclusion of this unit on cosine and sine functions, students will demonstrate a knowledge of periodic and circular functions. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Recognize a periodic function.	At the beginning of the course a handout on basic philosophy and a course outline with or without specific assignments might aid students. Chalkboard examples using Cartesian coordinates may be given.	1. Which of the following is (are) always equal to f(p) where f is a periodic function with domain R and fundamental period p? a. $f(2p)$ c. $f(p^2)$ b. $f(\frac{1}{p})$ d. $f(-p)$
2. Recognize the basic circular functions sine and cosine and find exact values for special values of x.	A polar graph at this time might help students with values of parts of pi. Frequent quizzes on basic identities.	2. Find all values of x in the interval $0 \leq x \leq 2\pi$. a. $\sin x = 1$ b. $\cos x = \frac{1}{2}$ c. $\cos x = -1$
3. Derive simple reduction formulas for addition of sine and cosine and prove simple identities involving sin x and cos x.		3. One of the expressions cos x, sin x, -cos x, -sin x is equivalent to the following: a. $\cos(x + \pi)$ b. $\cos(-x)$ c. $\sin(x - \pi)$ d. $\sin(-x)$
4. Graph the cosine and/or sine function over specified intervals of values of x.		4. On suitably marked graph paper graph the set $\{(x,y);\ y = \sin x,\ -\pi \leq x \leq 2\pi\}$
5. Derive and use simple identities involving sin 2x, cos 2x, sin ½x, cos ½x.		5. Derive the identity for sin 2x. If $\cos x = -1/3$ and x is between $\frac{1}{2}\pi$ and π, find the value of $\sin 2x$, $\cos 2x$, $\cos \frac{1}{2}x$.

Course or Grade Trigonometry

Concept: Tangent and reciprocal circular functions

Objective: At the conclusion of the unit on tangent and reciprocal circular functions, students will demonstrate a knowledge of tangents and reciprocal functions. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Demonstrate properties of the tangent, secant, cosecant, cotangent functions.	Using a device called a TRIGMASTER provide a means for students to manipulate a physical model of the unit circle. It is also possible to create a similar model by students using unlabeled polar graph paper with a cartesian system superimposed.	1. Find all real numbers x in the interval between $-\frac{1}{2}\pi$ and $3/2\ \pi$ for which the given equation is true. a. $\tan x = -1$ b. $\sec x = 2$ c. $\csc x = -\frac{2}{\sqrt{3}}$
2. Select the domains and ranges from a list.		2. For each set listed in the left-hand column, determine the correct set in the right-hand column. a. Domain of tan $A = \{\text{Reals}\}$ b. Range of tan $B = \{x: \lvert x\rvert \geq 1\}$ c. Domain of cot $C = \{x: \lvert x\rvert \leq 1\}$ d. Range of cot $D = \{x: x \in R,\ x \neq k,\ k \in J\}$ e. Domain of sec $E = \{x: x \in R,\ x \neq (2k+1)\frac{\pi}{2},\ k \in J\}$ f. Range of sec $F = \{x: x \in R,\ x \neq 2k\pi,\ k \in J\}$ $G = \{x: x \in R,\ x \neq \frac{\pi}{2} + 2k\pi,\ k \in J\}$
3. Graph the tan, sec, csc, cot functions.		3. Given graph paper, graph the tangent and reciprocal functions over 1 fundamental period.
4. Derive and verify identities using sin x, cos x and the definitions of the reciprocal functions.		4. Verify the following identities: a. $\sin x + \tan x = \tan x(\cos x + 1)$ b. $\cos 2x = 1 - 2\sin^2 x$ c. $\tan(\pi - x) = -\tan x$

Course or Grade: Trigonometry

Concept: Applications of Circular Functions

Objective: At the conclusion of this unit, students will demonstrate a knowledge of applications of circular functions. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use the concepts of amplitude, period, cycle, phase shift to graph circular functions.	Develop techniques for graphing members of the family $y = a \sin b (x - c) + d$ where a, b, c, d are defined with regard to amplitude, period, phase shift, vertical shift using transparencies with colors coordinated for amplitude, period, phase and vertical shift. Also give a suggested order of graphing.	1. Graph the following: a. $y = a \sin x$ b. $y = a \sin bx$ c. $y = a \sin b (x - c)$ d. $y = a \sin b (x - c) + d$
2. Apply circular functions to solve problems involving uniform circular motion.	Trig Sound Filmstrip showing graphing, amplitude and period.	2. A point is moving in a clockwise direction along a circle of radius 3 inches at a constant rotational velocity $\omega = \frac{\pi}{4}$. Find the length of arc traversed in 16 units of time.
3. Apply circular functions to solve problems involving simple harmonic motion.	Show filmstrip and cassette demonstrating harmonic periodic motion using guitar strings.	3. What are the two general forms for an equation that expresses the position y a time t of a particle moving in simple harmonic motion?

Course or Grade: Trigonometry

Concept: Inverses of Circular Functions

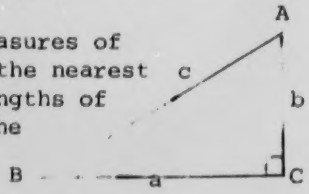
Objective: At the conclusion of the unit, students will demonstrate a knowledge of inverses of circular functions. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use the basic properties of inverse and principal inverse functions to find specific inverse values.	Use transparencies showing (color coded) relationships between domains of 6 circular functions which must be restricted so that inverses of Tan, Cot, Sec, Csc, Cos, Sin will be functions.	1. Find the value of expressions such as: a. $\mathrm{Cos}^{-1} \frac{1}{2}$ b. $\mathrm{Sin}^{-1} (-0.203)$ c. $\cos(\mathrm{Cos}^{-1} 0.800)$ d. $\mathrm{Tan}^{-1} 1$ e. $\mathrm{Csc}^{-1} (\sqrt{2})$
2. Express inverse functions in terms of arc lengths.	"Inverse Trigonometric Functions", 2 filmstrips, 2 cassettes.	2. Simplify: a. $\sin(\mathrm{Arcsin}\ \frac{1}{4} + \mathrm{Arccos}\ \frac{1}{2})$ b. $\mathrm{Arcsin} \frac{\sqrt{3}}{2} + \mathrm{Arcsin} \frac{\sqrt{2}}{2}$
3. Solve open sentences involving one circular function or two circular functions.		3. Solve: a. $\cot^2 x + 2 \cot x + 1 = 0$ b. $\sin^2 (x + 4) = 1$ c. $\sin 2x = 5 \cos x$ d. $1 - \sin^2 x = \cos 2x$

Course or Grade: Trigonometry

Concept: Trigonometric Functions

Objective: At the conclusion of this unit students will demonstrate a knowledge of right triangles, and non right triangles. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Change degree measure to radians and radian measure to degrees.	Text. Chalkboard illustrations. Karl Smith's book, Trigonometry for the College Student, has excellent problems suited for the high school student studying this chapter.	1. State the degree measure of the angle whose radian measure is a. $\frac{9\pi}{8}$ b. $-\frac{13\pi}{2}$ State the radian measure of the angle whose degree measure is a. -210° b. 500°
2. Prove trigonometric identities.	2 cassettes, 2 color filmstrips for solving word problems of right triangle trigonometry.	2. Verify: $\sin^2\theta(1 + \tan^2\theta) = \cos^2\theta(1 + \cot^2\theta)$
3. Relate trigonometric equations and inverse functions by finding values.		3. Simplify: $\cot^{-1}(\csc 90^{\circ})$ Solve for θ. $\tan^2\theta + \sqrt{3}\tan\theta = 0$
4. Solve right triangles using trigonometric functions.		4. Express measures of angles to the nearest 10' and lengths of sides to the nearest tenth or in radical form.  a. If $b = 3$ and $a = 4$, then $B = \underline{\ ?\ }$ and $A = \underline{\ ?\ }$. b. If $c = 10$ and $B = 33^{\circ}40'$, then $b = \underline{\ ?\ }$.
5. Use the law of Cosines to solve right triangles if given 2 sides and the included angle or 3 sides.	Filmstrip on Law of Cosines	5. Two submarines starting from the same point cruise for two hours, one covering 30mph and the other 40mph. If their courses diverge by 40°00', how far apart are they at the end of the two hours?

Course or Grade: Trigonometry

Concept: Trigonometric Functions

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
6. Use the Law of Sines to solve triangles given 2 angles and any side.	Filmstrip on Law of Sines.	6. Two lighthouses D and E are located 12.0 miles apart. A ship is observed between the two at point F, and an observer at lighthouse D notes that $\angle FDE$ measures $70^\circ 30'$. An observer in lighthouse E notes that $\angle FED$ measures $23^\circ 50'$. How far is the ship from each lighthouse?
7. Determine how many solutions are possible to solve a triangle given two sides and the measure of an angle opposite one of them.		7. Given a, b, and A, how many possible triangles ABC are there if (a) A is less than 90°, a is less than b sin A? (b) A is less than 90°, b sin A is smaller than a and a is less than b? (c) A is greater than or equal to 90°, a is less than or equal to b?
	Make available the game Trig-Tac-Toe which uses cubes with trig functions on them and a labeled tic-tac-toe board.	

Course or Grade: Trigonometry

Concept: Vectors

Objective: At the conclusion of this unit, students will be able to demonstrate a knowledge about basic operations involving vectors. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Exhibit properties of vectors by finding the **norm** of a vector, the sum of two vectors, product of a vector and a scalar, the dot product of two vectors.	The text is quite suitable for this unit. Use transparency and worksheets for Vectors in Two-Space from Milliken's Transparency-duplicating book.	1. Given: $\vec{u} = (-2,3)$, $\vec{v} = (4,-5)$. a. find the norm of $\overline{u}$. b. find the sum of $\vec{u}$ and $\vec{v}$. c. find $2\vec{u}$ d. find $\vec{u} \cdot \vec{v}$
2. Change Cartesian coordinates to polar coordinates and polar coordinates to Cartesian coordinates	Use transparency/worksheets on polar and rectangular coordinates from Milliken. Introduction to two-dimensional Vector Space 4 transparencies/manual.	2. Find the Cartesian coordinates of each of the points which are described in polar coordinates. a. $(3, 270^\circ)$ b. $(-5, \frac{2\pi}{3})$ Find a pair of polar coordinates for the point whose Cartesian coordinates are a. $(4\ -4)$ b. $(-1, \sqrt{3})$
3. Graph polar equations.		3. On polar graph paper, graph a. $\rho = 1 + \sin 2\theta,\ 0 \leq \theta \leq 2\pi$ b. $\rho = 2\cos 2\theta$
4. Identify a graph from its polar equation.		4. For each equation in Column 1, select from Column 2 the proper description of its graph. a. $\rho = 3$ A. a circle b. $\rho = \frac{1}{\cos\theta}$ B. a line parallel to the x-axis c. $\rho = 2\cos\theta$ C. a line parallel to the y-axis d. $\rho = -\theta$ D. a line through the origin e. $\theta = 120^\circ$ E. none of these

Course or Grade: Trigonometry

Concept: Complex Numbers

Objective: At the conclusion of this unit, students will demonstrate a knowledge of the properties of complex numbers and the relationships between complex numbers and vectors. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Perform the arithmetic operations but with complex numbers.	Develop axioms of a field using vector notation. Use Cassette/worksheets titled "Relations and Functions" in PH6 Library. Use transparency and worksheets on complex numbers from Milliken.	1. If $z_1=(5,2)$ and $z_2=(3,-1)$ express in ordered pair form: a. $z_1 + z_2$ b. $z_1 - z_2$ c. $z_1 z_2$ d. $\frac{z_1}{z_2}$
2. Express complex numbers in standard form a + bi.	Use TC 133-138 tape cassette and worksheets from PHS Library on Complex Numbers. "Polar Coordinates" 3 transparencies with manual.	2. Write each of the following in the form x + yi, x, y elements of Reals. a. $2i^{14}$ b. $-6 + \sqrt{-25}$ c. $\sqrt{3} - \sqrt{-3})^{2}$
3. Represent complex numbers graphically.		3. Show graphically the vector corresponding to z if $z = -2 + 3i$.
4. Represent complex numbers in polar form.		4. Change $\cos 150^\circ + i \sin 150^\circ$ to x + yi form. Change 2 - 2i to polar form.

GOALS OF ELEMENTARY FUNCTIONS

Students in Elementary Functions will:

1. Comprehend the function concept and its importance in mathematics.
2. Acquire facility in applying algebraic, exponential, logarithmic, and trigonometric concepts and skills.
3. Increase ability to employ graphical methods.
4. Understand intuitively the notions of limit and continuity.
5. Appreciate the need for precision of language.

Elementary Functions evaluation:

1. Grades from daily homework assignments.
2. Unit tests.
3. Frequent quizzes over basic functions or concepts.
4. Chapter tests and nine-week tests.
5. Semester examination

Course or Grade Elementary Functions

Concept: The Algebra of Functions

Objective: At the conclusion of this unit, students will demonstrate a knowledge of ordered pairs, mappings, graphs and operations on functions. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Recognize a function from a set of ordered pairs.	Show filmstrip TC 3030307 from PHS Library on Relations and Functions. Show filmstrip Introduction to Functions.	1. Which one of the following sets is not a function? a. $\{(2,1), (-1,5), (0,0), (6,2)\}$ b. $\{(-5,2), (1,2), (3,2), (5,2)\}$ c. $\{(-3,1), (4,2 , (7,5), (-3,0), (2,8)\}$ d. $\{(0,2), (\frac{1}{2},-1), (3,6), (\sqrt{5}, -1)\}$
2. Determine whether a set is a function or a relation which is not a function.	Use transparencies on the overhead projector for checking involved homework problems.	2. Which of the following are functions and which are relations that are not functions? a. $\{(x, \sqrt{2x}): x \geq 0\}$ b. $\{(x - 2, x): x \in R\}$ c. $\{(x^2 + 2, x): x \in R\}$
3. Determine, given a function, the domain and range of that function.		3. For the function $f: x \rightarrow \sqrt{9 - x^2}$, find a. the domain of f b. the range of f
4. Find the image of a function given the function and the pre-image.		4. Find the requested value of the given function in simple form indicating any necessary restrictions. $f: x \longrightarrow x^2 + 1$ a. $f(\frac{1}{y})$ b. $f(x - a)$

Course or Grade Elementary Functions

Concept: The Algebra of Functions

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
5. Use Cartesian coordinates to find distance between two points and the slope of a segment.		5. Given A(2,-3) and B(-1,1), find a. AB b. the slope of $\overline{AB}$
6. Determine if two segments or lines are parallel or perpendicular given their slopes or the equations of the lines.		6. Given the lines $y = 2x - 3$, $y = -\frac{1}{2}x + 5$, $4y = 8x + 7$, determine which lines are parallel and which lines are perpendicular.
6. Graph the special functions: Constant function, Identity function I, the absolute-value function, the "greatest-integer" function, the signum function.		6. Given graph paper, define and graph each of the functions: a. the constant function b. I c. $\|x\|$ d. $[x]$ e. sgn
7. Graph equations and functions.	Demonstrate using drawings the "vertical line test" for determining if a graph is a function.	7. Graph the equation given in (a) part and the function given in (b) part. (a) $y = 2x + 1$ (b) $f: x \rightarrow 2x + 1$ (a) $x^2 + y^2 = 4$ (b) $f: x \rightarrow \sqrt{4 - x^2}$
8. Find the sum, difference, product, quotient, and powers of functions, after first determining the domain of each operation.		8. If $f = \{(1,3), (2,3), (3,4)\}$ and $g = \{(1,0), (3,2), (4,3)\}$ find a. $f + g$ b. $f - g$ c. fg d. f/g e. g^2

Course or Grade Elementary Functions

Concept:

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
9. Perform the composition operation on two functions after first determing the domain.		9. If $f\colon x \rightarrow 2 - x^2$ and $g\colon x \rightarrow \sqrt{x - 1}$, find a. the domain of $g \bullet f$; b. a formula for $g \circ f$.
10. Find the domain and a formula for the inverse of a function.		10. If $f\colon x \text{—}\ \frac{1}{2}x - 1$, find a. the domain of f^{-1}; b. a formula for $f^{-1}(x)$

Course or Grade Elementary Functions

Concept: Polynomial Functions

Objective: At the conclusion of this unit, students will demonstrate a knowledge of linear and quadratic functions and their arithmetic. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use the point-slope form of the equation of a line.	Use the filmstrip Finding Equations of Lines for students needing extra help.	1. Find the equation of line which passes through $P_1(2,3)$ and $P_2(4,-2)$.
2. Use the slope-intercept form of the equation of a line.		2. Express the equation of a line in standard form if the slope is 2 and the y-intercept is 3.
3. Graph quadratic functions.		3. Graph the following functions a. $f: x \to x^2 - 4$ b. $f: x \to x^2 - 2x + 1$
4. Determine the real zeros, if any, of a given function.		4. Find the real zeros, if any, of the following: a. $f: x \to x^2 + 4x + 2$ b. $f: x \to x^2 + x + 1$
5. Find the extreme value of a function and determine if it is a maximum or a minimum.		5. Find the extreme value of the function and state if it is a maximum or a minimum. a. $f: x \to x^2 - 2x$ b. $f: x \to 4 - x^2$
6. Find the focus and directrix of a parabola given its equation.	Review conic sections from Algebra II.	6. Find the focus and directrix of $8x + y^2 = 0$.

Course or Grade Elementary Functions

Concept: Polynomial Functions

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
7. Determine the sum, difference, and product of polynomials using algorithms.		7. Find (a) the sum, (b) the difference, (c) the product of the polynomials $4x^3 + 3x + 1$ and $2x^2 - x + 5$.
8. Determine the quotient $Q(x)$ and the remainder $R(x)$ when given two polynomials by using synthetic division.		8. Find $Q(x)$ and $R(x)$ when $8x^3 - 6x^2 + 3$ is divided by $2x^2 + x - 3$.
9. Use the technique of synthetic substitution in the Remainder Theorem.		9. If $P(x) = x^4 - 5x^3 + 3x^2 - 2x + 18$ find $P(4)$.
10. Use the Factor Theorem to demonstrate $x - a$ is a factor of $P(x)$.		10. Show that $x - 2$ is a factor of $P(x) = x^4 - 4x^3 + 7x^2 - 12x + 12$.
11. Determine if a second polynomial is a multiple factor of the first and determine its multiplicity.		11. Show that $x-1$ is a factor of the polynomial $x^4 - 2x^3 + 3x^2 - 4x + 2$ and determine its multiplicity.
12. Determine rational roots and multiplicities of a polynomial.		12. Find all rational roots and their multiplicities of $3x^3 - 10x^2 + 7x + 10 = 0$.
13. Use Descartes' Rule of Signs to determine the number of roots and synthetic division to find upper and lower bounds.	Refer students to Dickson, L.E., *New First Course in the Theory of Equations* (New York: John Wiley and Sons, Inc., 1939) for a proof of Descartes' Rule of Signs.	13. For the equation $x^5 - 3x^3 + 2x - 3 = 0$ a. find the number of positive roots; b. find the number of negative roots; c. find the least positive integer which is an upper bound.

Course or Grade Elementary Functions

Concept: Introduction to Differential Calculus

Objective: At the conclusion of this unit, students will demonstrate a knowledge of limit concept and apply this to ideas of continuity and differentiation of functions. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find the limit of a given polynomial.	Use FS/K234-239 Introduction to Calculus: Limits and Functions from PHS Library.	1. Find a. $\lim\limits_{x \to 1} (x^2 + 2x)$ b. $\lim\limits_{x \to 0} (x^3 + 4)$ c. $\lim\limits_{x \to 1} \frac{x - 1}{x^2 - 1}$.
2. Determine if functions are continuous.		2. At what numbers, if any, do the following functions fail to be continuous? a. $f: x \to x^2 - 4$ b. $f: x \to \operatorname{sgn}(x - 1)$
3. Find the derivative of f at a using the definition of derivative.		3. Given $f: x \to 9 - x^2$. Find $f'(a)$.
4. Find the derivative of a polynomial using direct substitution and the "double division" process.		4. For the polynomial function $f: x \to x^4 - 2x^3 - 3x^2 + 7x + 3$ find $f(2)$ and $f'(2)$.
5. Graph polynomial functions using critical points and relative maxima and minima, and convexity.		5. $f: x \to x^3 + 3x^2 - 2$ a. Find the coordinates of any relative maxima or minima of f. b. Find the coordinates of any inflection points. c. State the interval(s) where the curve is convex upward. d. Find the real zeros of the function. e. Sketch the graph of f and f'.

GOALS OF ADVANCED MATHEMATICS

1. Understand the interrelationships between algebraic and geometric concepts.
2. Solidify the fundamentals of high school mathematics while introducing concepts of higher mathematics as extensions of familiar ideas.
3. Enrich the student's mathematical background.
4. Prepare for college mathematics.

EVALUATION FOR ADVANCED MATHEMATICS

1. Grades from daily homework assignments.
2. Unit tests.
3. Nine weeks tests
4. Semester tests.

Course or Grade Advanced Mathematics

Concept: Coordinate Geometry of Points and Lines

Objective: At the conclusion of the unit on coordinate geometry of points and lines students will demonstrate a knowledge of the interrelationships of geometry and algebra. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find the length and midpoint of a line segment.	Filmstrip, Finding Equations of Lines	1. Find the distance AB and the midpoint of $\overline{AB}$ for A(-2,-6) and B(7,6).
2. Find the point of intersection of two lines by graphing or by solving a system of linear equations using determinants.		2. Solve the equations $3x + 7y = 11$ and $4x + 9y = -8$ by using determinants and check the solution by graphing.
3. Find the slope of a nonvertical line.		3. What is the slope of the line $4x - 2y + 7 = 0$? What is the y-intercept?
4. Find an equation of a line given certain geometric properties of the line.		4. a. Find the equation of a line with slope 2/3 and y intercept -5. b. Write an equation of the line through A (1,5) and B (4,-1). c. Write an equation of the line through (6,2) and parallel to the line $5x - 3y = 2$.

Course or Grade Advanced Mathematics

Concept: Coordinate Geometry of Conic Sections

Objective: At the conclusion of the section on conics students will demonstrate a knowledge second degree equations and their graphs. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Solve a quadratic equation with real-number coefficients.	Review the derivation of the quadratic formula by completing the square. Discuss nature of roots using the discriminant.	1. Find the roots of $7(x^2-2x) = -9x + 2$.
2. Find an equation of a circle given its center and radius, and to find the center and radius of a circle given its equation.		2. a. Find the center and radius of the circle $x^2 + y^2 - 12x + 10y + 45 = 0$. b. Find an equation of the circle with center (-3,4) which is tangent to the line $y = 8$.
3. Graph, and find equations of, parabolas, ellipses, and hyperbolas.		3. a. Sketch the parabola $y = 6x - x^2$. What is the vertex of the parabola? b. Find an equation of the ellipse with center at the origin, a vertex at (4,0), and minor axis 6 units long. c. Sketch the graph of $\frac{(x - 3)^2}{9} + \frac{(y + 4)^2}{16} = 1$ d. Find an equation of the hyperbola with center at the origin, a vertex at (5,0), and a focus at (6,0).
4. Find intersection points of lines, circles, and parabolas given their equations.		4. a. Consider the parabola $y = x^2 + x + 4$ and the three lines $y = 4x$, $y = -3x$, and $y = 2x + 6$. One of these lines is tangent to the parabola, one intersects the parabola in two points, and one does not intersect the parabola. Which line is which? b. Find an equation of the line containing the common chord of the circles $(x -3)^2 + y^2 = 9$ and $x^2 + y^2 = 18$.

Course or Grade Advanced Mathematics

Concept: Inequalities and Their Graphs

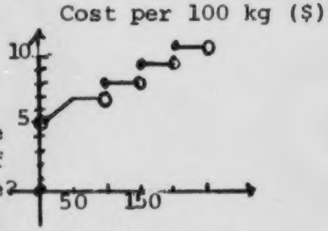
Objective: At the conclusion of the unit on inequalities students will demonstrate a knowledge of linear and quadratic inequalities. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Solve and graph linear and quadratic inequalties in one and two variables.		1. a. Solve and graph: aa. $5 - 4x > 3$ bb. $\lvert x - 1 \rvert < 5$ b. Solve $4x^2 + 5x - 6 \geq 0$ c. Graph the solution set of the system $x^2 + y^2 \leq 25$ and $\lvert x \rvert < 2$.
2. Use the discriminant to find an equation of a line tangent to a conic section.		2. Using k as a parameter, write an equation of a line with slope 4.

Course or Grade Advanced Mathematics

Concept: Functions

Objective: At the conclusion of the unit on functions students will demonstrate a knowledge of functional relationships. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Interpret the graph of a functional relationship occurring in everyday life and aswer questions regarding the graph.	Filmstrip, Introduction to Functions.	1. Using the graph shown answer the following question.  a. What variable is a function of another variable? b. What is the cost of sending 300 kilograms of freight 170 kilometers?
2. Find specified function values given an equation of the function.		2. If $f(x) = 3x - 5$, find $f(0)$, $f(1)$, $f(2)$.
3. State the domain, range, and zeros of a function and to sketch the graph of the function.		3. a. Give the domain, range, and zeros of the following functions: aa. $f(x) = \sqrt[4]{x + 4}$ bb. $g(x) = \sqrt{4 - x^2}$ b. If $f(x)$ is a quadratic function of x with zeros 1 and 3 and with range consisting of all $y \geq -4$, sketch the graph of $f(x)$ and find an equation for $f(x)$.
4. Find an equation, and identify the domain, of the composite of two functions.		4. Suppose $f(x) = 2x - 1$ and $g(x) = x^2 - 3$. a. Evaluate $f(g(4))$. b. Evaluate $g(f(x))$.
5. Find an equation, and sketch the graph, of the inverse of a function.		5. Find an equation of $f^{-1}(x)$ for $f(x) = 3x - 1$. Draw the graph of $f(x)$ and $f^{-1}(x)$ on the same set of axes.

Course or Grade Advanced Mathematics

Concept: Exponents and Logarithms

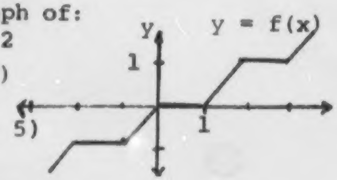
Objective: At the conclusion of this unit students will demonstrate a knowledge of operations with exponents and logarithms. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use the definitions and properties of exponents and logarithms to simplify and evaluate expressions and solve equations.	Filmstrip, *Logarithms*.	1. Evaluate the following: a. $8^{2/3}$ b. $9^{-\frac{1}{2}}$ c. $(2^{-2} + 2^{0})^{-2}$ d. $(2x^{2/3}y^{-1})^{-3}$
2. Graph exponential and logarithmic functions.		2. On one set of axes, sketch the graph of $y = 2^{x}$ and $y = \log_2 x$.
3. Perform numerical computations using logarithms.		3. Evaluate: a. $\log_2 8$ b. $\log_5 25\sqrt{5}$ c. $\log_{10} 0.01$

Course or Grade Advanced Mathematics

Concept: Graphs of Functions

Objective: At the conclusion of this unit students will demonstrate a knowledge of how simple changes in the equation $y = f(x)$ will affect its graph. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Sketch the graphs of equations of the form $y = f(x) \pm c$, $y-k = f(x-h)$, $y = c\,f(x)$, $y = f(cx)$ and $y = f(x)$ given the graph $y = f(x)$.		1. Sketch the graph of: a. $y = f(x) + 2$ b. $y = f(x + 2)$ c. $y-4 = f(x - 5)$ d. $y = 2\,f(x)$ e. $y = \|f(x)\|$ f. $y = f(-x)$ 
2. Determine whether a graph is symmetric with respect to the coordinate axes, the origin, or the line $y = x$.		2. Do the graphs of the following equations have symmetry with respect to (a) the x-axis, (b) the line $y = x$, (c) the y-axis, and (d) the origin? (1) $y = \sin x$ (2) $y^2 + xy = 2$ (3) $x^2 + y^2 = 1$
3. Sketch the graph of an equation of the form $y = 1/f(x)$ and find its asymptotes.		3. Sketch the graph of $y = 1/(x-3)$ and give the equations of its asymptotes.

Course or Grade Advanced Mathematics

Concept: Techniques of Equation Solving

Objective: At the conclusion of this unit students will demonstrate a knowledge of techniques of equation solving. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Solve equations of linear and quadratic form in $f(x)$.		1. Solve each of the following equations for x. a. $5\|x + 7\| - 3 = 27$ b. $5(4x)^{3/2} = 135$ c. $5 + 8 \sin x = 1$ d. $5 \log_2 x - 15 = 0$ e. $2 \cos^2 x - \cos x - 1 = 0$ f. $2^{2x} + 32 = 12 \cdot 2^x$ g. $\log_2(x - 3) + \log_2 (x + 3) = \log_2 16$
2. Solve two simultaneous linear equations in $f(x)$ and $g(y)$.		2. Solve each of the following pairs of equations for x and y. a. $2\sqrt{x} + 4\sqrt{y} = 23$ $4\sqrt{x} - \sqrt{y} = 13$ b. $2^{2x-y} = 8$ $2^{x-2y} = 16$
3. Solve graphically two simultaneous quadratic equations in x and y or a single equation of the form $f(x) = g(x)$.		3. Solve the equation $2^x = 9 - x^2$ graphically, giving answers to the nearest 0.5.

Course or Grade Advanced Mathematics

Concept: Sequences and Series

Objective: At the conclusion of this unit students will demonstrate a knowledge of arithmetic and geometric sequences and series. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Identify an arithmetic or geometric sequence and find a formula for its nth term.	Sound filmstrip, Sequences and Series.	1. State whether the given sequence is arithmetic, geometric, or neither. In each case give an explicit formula for t_n in terms of n. a. 8,12,18,27,... b. 30,22,14,6,... c. 4,9,16,25,36,...
2. Find the sum of the first n terms of an arithmetic or geometric series.		2. a. Find t_{25} and S_{25} for the arithmetic series 4 + 7 + 10 +... b. Find (in terms of n) t_n and S_n for the geometric series $1 + \frac{1}{2} + \frac{1}{4} + \ldots$
3. Find or estimate the limit of an infinite sequence or to determine that the limit does not exist.		3. For each of the following, state the value of the limit if it exists. Otherwise, state "no limit." a. $\lim\limits_{n \to \infty} \frac{2n - 1}{4n}$ b. $\lim\limits_{n \to \infty} \frac{2n^2 - 3n}{5n + 1}$
4. Find the sum of an infinite geometric series.		4. Find the sum of the infinite geometric series 9 - 6 + 4 - ...
5. Represent series using sigma notation.		5. a. Write in expanded form and then evaluate: $\sum_{k=0}^{4} (-1)^k (2k + 1)$ b. Express using sigma notation: 1/2 + 2/3 + 3/4 + ... + 50/51

Course or Grade Advanced Mathematics

Concept: Probability

Objective: At the conclusion of this unit students will demonstrate a knowledge of permutations, combinations and probability. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Apply the Multiplication and Addition Principles for performing two or more actions.		1. How many 4-digit numbers can be formed using the digits 1,2,3,4,5,6: a. if the number is to contain no repeated digits? b. if repeated digits are allowed?
2. Solve problems involving permutations, combinations, and probabilities.		2. a. In how many ways can a committee of 3 be elected from a club of 12 members? b. Two dice are rolled. What is the probability that their sum is 7 or 11?
3. Expand binomials and use the Binomial Theorem to solve probability problems.		3. a. Give the series expansion for $(2x + y)^4$. b. Write the first 4 terms in the series expansion for $(a + b)^{25}$

Course or Grade Advanced Mathematics

Concept: Polynomials

Objective: At the conclusion of the section on polynomials students will demonstrate a knowledge of solving and graphing functions of polynomials. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Solve and graph certain types of polynomial equations by factoring.		1. Factor the following polynomials and sketch the graphs of the functions they define. a. $P(x) = x^3 - 6x^2 + 9x$ b. $P(x) = x^4 - 5x^2 + 4$
2. Apply the Remainder Theorem and the Factor Theorem.		2. a. Use the Remainder Theorem to find the remainder when $x^{100} - 5x^{95} - 7x^2 - 2$ is divided by $x + 1$. b. Use synthetic division to evaluation $P(3/2)$ if $P(x) = 2x^3 + x^2 - 1$
3. Find the rational roots of a polynomial equation.		3. Find all real and complex roots of the equation $x^3 - x^2 + 2 = 0$.
4. Find the sum and product of the roots of a polynomial equation.		4. Find the sum and product of the roots of $3x^3 - 5x^2 + 2x + 4 = 0$.

GOALS OF CONSUMER MATHEMATICS

Students will:

1. Develop skills they will need in consumer situations now and as adults.
2. Understand net and gross pay, banking and buying on credit.
3. Cope with transportation and housing.
4. Develop a background for an awareness of taxes and insurance.
5. Realize a need for skills in purchasing and budgeting.

EVALUATION FOR CONSUMER MATHEMATICS

1. Homework assignments.
2. Chapter and unit tests
3. Nine week tests and semester tests.
4. Individual projects.

Course or Grade Consumer Mathematics

Concept: Income

Objective: At the conclusion of the first unit on income, students will demonstrate a knowledge of calculating income. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Compute gross pay by using hourly and overtime rates.	Have a representative from an employment agency discuss occupations, pay, and fringe benefits. He could conduct mock job interviews with students and discuss how to prepare for job interviews.	1. Kay Soto earns $4.50 per hour for a 40-hour work week, and time and a half for overtime. One week she worked 56 hours. Find her gross pay.
2. Compute gross pay for employees paid hourly wages plus tips.	Consult two or three employers to find out about fringe benefits.	2. Mary Harvey makes $3.50 per hour plus tips. One week she worked 35 hours and earned $39.20 in tips. She gives 15% of her tips to other employees. Find Mary's gross pay for the week.
3. Compute earnings for employees paid straight commission.	Use employment ads from area newspapers to make lists of jobs that pay according to different wage systems.	3. Dwayne Johnson, a route salesman, makes 15% straight oommission. One week, he had sales of $1560. What was his gross pay for the week?
4. Compute earnings for employees paid salary and commission.	Have students select careers that appeal to them. They should determine the training that is required, the number of annual openings, opportunities for advancement, and any relocation requirements for the career. The students should determine the type of wages and the amount that a new employee could expect to earn. This career could be the basis for a continuing project throughout the year.	4. Dotty Koontz receives a salarv of $100 per week and a commission of 5% of all sales delivered. Last week, she had sales of $3000 and cancellations or $1200. Find Dotty's gross pay.
5. Compute earnings for employees paid salary and graduated commission.		5. Dale Keller is paid $350 per month and a commission of 3% of the first $2000 of his sales, and a 4.5% of all his sales over $2000. He sold $3500 worth of lumber last month. What was his gross pay?

Course or Grade Consumer Mathematics

Concept: Income

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
6. Find the amount withheld from gross pay for federal income taxes and social security and compute the net pay.		6. a. Max Steiner is married and claims four exemptions. He makes $289.46 per week. Using a table find the amount whitheld from his weekly paycheck for federal income taxes. b. Max makes less than $16,500 per year. Find the amount withheld from his paycheck each week for social security. c. Max has other deductions totaling $2.35 each week. What is Max s net pay each week?
7. Use information from ads to compute and compare wages for various jobs.		7. Use the ads shown. Which receptionist pays more per week? How much more does it pay each week? A. Receptionist for small office, $165 week. Wonderful all public contact job. You'll be the one to greet and direct everyone, be on phones, and give info. Must type, be personable, enjoy people. Will train. B. Receptionist. Professional organization is seeking an individual to become the front offict receptionist. Duties are to greet clients, keep daily records of staff, make airline reservations, and various other duties. $3.85/hr. 40 hr. wk.

Course or Grade Consumer Mathematics

Concept: Income

Objective: At the conclusion of the second unit on income, students will demonstrate a knowledge of personal banking. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Write a deposit slip, a check, fill out a check stub.	Obtain copies of several bank statements and iscuss the directions given on the forms for reconciling the statement. Ask a local bank to send a representative to the classroom to discuss some or all of the following: 1. Routing of checks through the Federak Reserve System. 2. Overdrafts. 3. Stop payment orders. 4. Other banking services: safe-deposit boxes, traveler's checks. 5. Career opportunities in banking. 6. The different kinds of savings accounts: regular, passbook, and time accounts.	1. Given sample deposit slips and checks: a. Fill out a deposit slip with a deposit of $8.75 in cash, and checks of $29.80, $37.40, and $5.23 and receiving cash of $25.00. b. Write a check for $75.20 for materials and fill out the check stub with balance brought forward of $93.57, deposit of the amount in a above.
2. Reconcile a bank statement with a check register.		2. The ending balance on a bank statement is $196.50. There are outstanding checks for $19.50 and $125.25, and an outstanding deposit of $57.56. Find the adjusted statement balance.
3. Compute simple interest for a savings account by using the formula i = prt.		3. A savings account pays 4.5% simple interest. Find the amount of interest that $1500 will earn in eight months.
4. Compute the total interest for a savings account when the interest is compounded annually, semi-annually or quarterly.		4. Find the amount of interest earned in two years by an account of $1300 that pays 8% interest compounded annually.
5. Compute interest in a savings account using a compound interest table.		5. Use a table to find the amount of interest earned on $400 at 7% interest compounded semiannually for 5 years.

Course or Grade Consumer Mathematics

Concept: Income

Objective: At the conclusion of the third unit on income students will demonstrate a knowledge of consumer credit. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Compute the interest and the total amount due on a promissory note.	Invite a guest speaker from a bank, a finance company, or a credit counseling service to talk about some or all of the following: requirements needed to obtain a loan or charge account, prepayment clause, credit traps, how current interest rates are determined.	1. A promissory note for $1800 is due in 60 days. The interst rate is 8.5%. a. Find the amount of interest due in 60 days. b. Find the total amount due in 60 days.
2. Compute the finance charge for a charge account using the balance after payments.		2. Find the amount of the finance charge on an account with an unpaid balance of $127.30 and a payment of $20.00 with finance charge of 1.5% per month of the balance after payments.
3. Compute the finance charge for a charge account, using the average daily balance.		3. Find the average daily balance in an account during the month of September if on September 1 the unpaid balance is $90.60 and September 11 a payment of $30.00 is made and no purchases were made during September.
4. Find the amount of a monthly installment on a level-payment loan.		4. Find the amount of the monthly payment on a level-payment loan of $600 at 12% for 18 months.
5. Compute the finance charge on an installment purchase.		5. What is the amount financed by this installment plan: cash price: $375.16; down payment: 10%; payment plan: 24 monthly payments of $16.85.

Course or Grade Consumer Mathematics

Concept: Transportation

Objective: At the conclusion of the first unit on transportation, students will demonstrate a knowledge of buying a car. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Compute the total cost of buying a used car.	Have students investigate, either through newspaper ads or outside of school, the cost of a used car they would buy. Determine the fees and taxes and find the total cost of the used car.	1. The price of a used car is $1475. The state sales tax is 5% of the price of the car. Find the amount of the state sales tax. The title fee is $6.50 and the license plate fee is $32. The car needs repairs that will cost $47.25. Find the total cost of the car.
2. Compute the sticker price of a new car.		2. The base price of a mid-sized car is $4725. Find the sticker price of the car with these options (use a prepared table). Power steering AM-FM radio Air conditioner Bumper guards, front and rear
3. Determine a reasonable price to offer for a new car, using a percentage guideline.		3. A subcompact car has a sticker price of $4290. Find a reasonable offer for the car. (Use the guideline that 90% of sticker price is a reasonable offer).
4. Compute the deferred payment price of a car, and compute the finance charge for a new car loan.		4. The total cost of Sam's new car is $5725. He made a down payment of $1700. Sam can finance the car for 24 months. His monthly payment is $193.24. a. Find the deferred-payment price. b. Find the finance charge.

Course or Grade Consumer Mathematics

Concept: Transportation

Objective: At the conclusion of the second unit on transportation, students will demonstrate a knowledge of automobile operating expenses. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find gasoline costs.	Ask an insurance agent to tell the class about good student discounts, the savings gained by adding insurance for a student to a family policy.	1. Daniel drove 1200 km during August. He bought 218 liters of gasoline, which cost $41.42. a. Find his car's fuel consumption. b. Find the cost of gasoline for each km that Daniel traveled.
2. Find the trade-in value and the amount of depreciation of a car.		2. Isabel bought a new $5600 car 3 years ago. What is the trade-in value of the car now? (Use the guideline that after 3 years, the trade-in value is 42% of the original selling price.) How much has Isabel's car depreciated?
3. Compute the annual premium for automobile liability insurance; for automobile collision and comprehensive insurance.		3. Miyoshi, age 17, has a class C car. She is buying collision insurance with $50 deductible and comprehensive insurance with $50 deductible. How much is her total premium?
4. Find the annual expense of a car.		4. Joyce Jensen drove 15,000 km last year. She recorded these expenses for her car during the year: Depreciation $1380.00 Fixed costs 2267.15 Variable costs 485.33 a. Find the total cost for the year. b. Find the cost per kilometer.

Course or Grade Consumer Mathematics

Concept: Transportation

Objective: At the conclusion of the third unit on transportation, students will demonstrate a knowledge of travel and expenses. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find distance and traveling time.	Obtain road maps from the state highway department. Have students select a place to visit and then compute the distance and the driving time.	1. Deborah Canfield will drive from Allentown to Scranton. Using a map, find: a. the distance she will drive. b. the number of hours she will drive at a rate of 80 km/h.
2. Compute the total expenses incurred while traveling.	Invite a travel agent to the class to speak about the services offered by a travel agent.	2. Warren Crown will be driving from Yellowstone National Park to Grand Canyon National Park, a distance of 1260 km. His car's fuel consumption should be about 6.2 km/L because of some driving in the mountains. He is allowing $25 for meals. He will spend two nights in motels for about $20 each night. a. Find the amount of gasoline Warren will need. At $0.20 per liter, how much will the gasoline cost? b. Find Warren's total traveling expenses.
3. Compute and compare air fares by using various plans.		3. Two adults and one child, age 6, are flying coach from Chicago to New York. Using a fare summary find their total one-way fare. How much will their round trip cost?
4. Compute the cost of renting a car.		4. Molly has just returned a car that she rented for 4 days. She drove 673 km. She will be charged $17 per day and $0.13 per km driven. Find her rental cost.

Course or Grade Consumer Mathematics

Concept: Housing

Objective: At the conclusion of the first unit on housing, students will demonstrate a knowledge of renting and decorating a home. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Compute a reasonable amount to spend for rent and compare the costs of renting.	Have students look through local ads and choose a specific apartment. Let them estimate expenses. Obtain information from local electric company and gas company how to save money.	1. Linda earns $6.75 per hour in a 40-hour work week. Using the "week's ross pay" rule of thumb, what is the most she should spend for rent each month? What will be her total monthly expenses if she spends about $25 per month for electricity and about $13 a month for gas?
2. Find the number of liters of paint needed to paint a room.	Have students measure and determine the amount of paint and/or wallpaper needed to decorate a room at home. Use costs from local merchants. Students might compare the costs of painting versus wallpapering.	2. Eleanor is going to paint the walls and the celing of her den. The room measures 3.7m by 4.25m and is 2.5m hight. Find the area to be painted and the number of liters of paint needed.
3. Determine the number of rolls of wallpaper needed to paper a room.		3. Jack wants to wallpaper his bedroom. The bedroom measures 3.85m by 4.3m by 2.5m. The room has 4 standard openings. Find the number of rolls of wallpaper Jack should order if one roll covers about 3 m^2.
4. Compute the number and the cost of tiles needed to cover a floor.		4. How many carpet tiles that are 30 cm square will be needed to cover a floor 5.25m by 4.5m? A package of 10 tiles cost $10,80. Find the cost of the tiles.

Course or Grade Consumer Mathematics

Concept: Housing

Objective: At the conclusion of the second unit on housing, students will demonstrate a knowledge of buying a home. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Use a general guideline to compute the cost of an affordable home.	Arrange a field trip to a nearby housing development. Prepare students to look for: size of lot, type of heating, amount of insulation, quality of fixtures.	1. Carol Madsen earns $7.45 per hour in a 40-hour work week. What is the greatest amount she should spend for a home? (Use the general guideline of 2.5 times annual income.)
2. Find the amount of the down payment and the amount of the monthly mortgage payment.	Have an insurance agent visit to discuss the need for homeowners insurance.	2. Juan Espejo is buying a condiminium for $48,500. He must make a 20% down payment. a. What is the amount of the loan after the down payment? b. What is the monthly payment for Juan's loan if the annual interest rate is 9.25%?
3. Compute the amount of interest on a mortgage loan.		3. What is the total amount of interest that will be paid on a loan of $35,000 at 8.5% annual interest for 30 years? The monthly payment is $269.15
4. Find the amount paid on the principal and the amount of interest in consecutive monthly mortgage payments.		4. Nancy Miller borrows $27,000 at 8% annual interest for 25 years. a. What is the amount of interest she will pay the first month? b. If Nancy's monthly payment is $208.44, what is the principal for the second month?
5. Compute an insurance premium for valuables in a home.		5. Joyce's annual premium for her homeowner's insurance is $125. She wants to insure a watch worth $225 separately. What is the total premium for her insurance? (Use a table.)

Course or Grade Consumer Mathematics

Concept: Housing

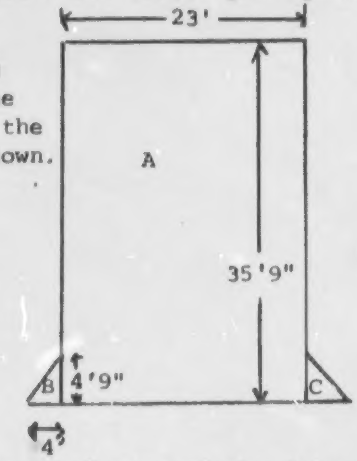
Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
6. Compute the assessed valuation of property and the property taxes.		6. The Staten's property has a market value of $38,500. The rate of assessment in the area is 60%. The tax rate is $3.23 per $100 of assessed valuation. What is the Staten's property tax?
7. Find the closing costs of buying a home.	Have a lawyer or a bank representative discuss closing costs. Topics for discussion could include the role of the lawyer, the title search and title insurance.	7. The Condiffs paid a lawyer's fee of .5% of the purchase price of their home. What was the fee if the house cost $47,800?

Course or Grade Consumer Mathematics

Concept: Housing

Objective: At the conclusion of the third unit on housing, students will demonstrate a knowledge of building a home. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Estimate the cost of building a home by using costs per square foot.	Obtain one or more house-plan books. Estimate the cost to build a particular house shown. Compare it to the cost of a comparable dwelling in the same area that may be for sale.	1. Given a house plan with measurements, find the area of the house and the cost estimate for the home if a builder makes a bid of $35 per square foot.
2. Estimate the cost of installing a driveway by finding the area and using the costs per square foot.		2. a. Find the areas of the regions of the driveway shown.  b. Find the total area of the driveway. c. What is the cost of the driveway if a contractor will install it for $0.90 a square foot?

Course or Grade Consumer Mathematics

Concept: Taxes, Insurance, Investments

Objective: At the conclusion of the first unit, students will demonstrate a knowledge of income taxes. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Compute the total income, the standard deduction, and the amount for exemptions, to determine an individual's taxable income.	Obtain classroom sets of teaching units from the Taxpayer Education Coordinator at the district office of the IRS. Have an income tax consultant address the class concerning the specific problems of students filing their first return. Write the Public Affairs Officer of the district office of the IRS.	1. Daisy Smurlo is single. Her income for the year includes wages of $11,250 and interest of $85. Using a table find her standard deduction. Daisy claims 1 exemption. What is her taxable income?
2. Find the tax required by using a table and tax credit information.		2. Daren and Lois Gwinn's taxable income is $17,562. They are married filing a joint tax return. They claim 3 exemptions. a. What is their tax required for the year? (Use tables) b. The Gwinns had $3760 in federal income tax withheld from their earnings this year. What is their refund or their balance due the IRS?
3. Compute the total amount of a taxpayer's itemized deductions and compare it with the standard deduction.		3. Mark and Britta Garcia are married filing jointly. Their total income is $18,256. a. What is their standard deduction? b. The Garcias' itemized deductions are as listed: property tax, $750; gasoline tax, $61; general sales tax, $181; mortgage interest, $2548; loan interest, $352; contributions, $104; miscellaneous deductions, $55. What is the total of their itemized deductions? c. Which is greater, their itemized deductions or the standard deduction?

Course or Grade Consumer Mathematics

Concept: Taxes, Insurance, Investments

Objective:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
4. Compute state income tax, using a New Mexico table.		4. Dennis Franklin lives in Portales. His taxable income is $11,200. What is his New Mexico state income tax?

Course or Grade Consumer Mathematics

Concept: Taxes, Insurance, Investments

Objective: At the conclusion of the second unit, students will demonstrate a knowledge of health, life and retirement insurance. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Find the amount of medical expenses paid by insurance and the amount the insured pays	Ask an insurance agent to be a guest speaker. Ask the agent to bring in a mortality table and explain how it is compiled and how it affects insurance rates.	1. Pam Rutledge has a $50-deductible health insurance policy. The insurance company pays 75% of all covered medical expenses after the deductible amount. Pam was hospitalized with an ear infection. Her medical bills amounted to $1735.25. How much did Pam pay?
2. Compute annual premiums for term life insurance.		2. Beth Stolie is 25 years old. She bought $75,000 worth of term life insurance. How much did she spend per year for the insurance?
3. Find annual premiums for straight life, limited payment life, and endowment insurance.		3. Ted Larson bought $30,000 worth of straight life insurance at age 27. Using a table, what is his annual premium? In 20 years what will be the cash value of Ted's insurance?
4. Compute annual social security retirement benefits.		4. Cora Lessing was born in 1912. She retired at the age of 65. Her average annual income for the 19 years from 1958 through 1976 is $7465. What does Cora receive annually from social security?

Course or Grade Consumer Mathematics

Concept: Taxes, Insurance, Investments

Objective: At the conclusion of the third unit, students will demonstrate a knowledge of investments. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Compute the cost of Series E Savings Bonds and the redemption value.	Ask a broker to discuss with the class the element of risk that is present in all types of investing.	1. What is the cost of a $75 Series E Savings Bond? What is the redemption value after 6 years. (Use a table provided.)
2. Compute the interest earned on a certificate of deposit.	Ask a law-enforcement officer to discuss illegal get-rich-quick schemes and "confidence games."	2. Dana Evans bought a $4000 CD that earns 6.75% interest compounded daily. She receives an interest check every 3 months. How much interest does she receive every 3 months?
3. Find the total cost of an investment in common stock.		3. Ellen Drake bought 70 shares of stock for $53.375 per share. She paid a commission of $54. What was the total amount Ellen invested.
4. Compute the interest earned on a bond and the annual yield.		4. Rita bought a $1000 bond that matures in the year 2016. It pays 8.25% interest. She paid $1020 for the bond. What is the annual yield on her investment.

Course or Grade Consumer Mathematics

Concept: Purchasing and Budgeting

Objective: At the conclusion of the first unit on purchasing and budgeting, students will demonstrate a knowledge of buying food. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Compute the cost of a grocery item.	Have each student take the same shopping list to a grocery store and record the prices of several items. Compare the results. Repeat the same process with the same list two or three weeks later.	1. Find the cost of 2 cans of beans at 3/$.89. (Round the answer up to the next whole cent.)
2. Compare the cost of buying separate cuts of meat with the cost of buying a side of beef.	Have students try different brands of food, including "house" brands. Compare these for taste, quality, and price.	2. a. How many kg of sirloin steak can be expected from a 130kg side of beef? (8.3% of the side of beef will be sirloin steak.) b. How much would the sirloin steak cost at the grocery store if the current cost of sirloin steak is $4.59 per kg.
3. Compare meal costs.		3. Irene and Stan Tyrrell want to compare the cost of eating in a restaurant with the cost of having the same dinner at home. They recently had a fish dinner at a restaurant that cost $12.35 and they left a 15% tip. Preparing the meal at home costs $6.25. What is the difference in cost between eating out and eating at home?

Course or Grade Consumer Mathematics

Concept: Purchasing and Budgeting

Objective: At the conclusion of the second unit, students will demonstrate a knowledge of buying, making, and renting goods. They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Complete a catalog order form, using a table of costs for parcel post.	Have students compare prices and quality of merchandise sold in department stores and discount stores. Set up a hypothetical project for the class, such as furnishing a recreation room for a youth center. Items needed might include furniture, rugs, wall decor, lighting, stereo, and refrigerator. Investigate the cost of obtaining these goods by buying, making, and renting. They should also consider garage sales, used furniture stores, donations, and the cost of refurbishing used items.	1. Using a catalog, purchase a 3 piece pantsuit and blouse. Fill out the form in the catalog, determining sales tax, and parcel post charges as well as the total cost of the pantsuit and blouse.
2. Compute the amount and cost of materials needed for a sewing project.		2. The members of the Choir want vests for the girls. If 1 1/4 yards of fabric are needed to make one vest, how much fabric is needed to make 9 vests?
3. Determine the best month for buying certain items, using a chart, and compute the amount of discount and the sale price of an item.		4. TV sets are often on sale in June. The regular price of a certain model is $345. What is the sale price with a 15% discount?
4. Compute the cost of lumber and other materials for a building project.		4. Find the cost of four boards, each 2" x 6" x 10', at $.30/board foot.
5. Compute the cost of renting an item.		5. Find the cost of renting a car polisher for 4 1/2 hours at $1.75 per hour.

Course or Grade Consumer Mathematics

Concept: Purchasing and Budgeting

Objective: At the conclusion of the third unit, students will demonstrate a knowledge of budgeting.
They will be able to:

LEARNER OUTCOMES	MATERIALS/METHODS	EVALUATION
1. Analyze spending by keeping organized records of variable monthly expenses.		1. Keep a record for four weeks of all spending. Compare the spending items and categorize them. Total each category and then total the entire spending.
2. Budget variable expenses using average expenses from records of several months.		2. The budgeted amounts for Rae's variable monthly expenses are: food, $15; car, $20; entertainment, $20; gifts, $7; and miscellaneous, $10. What is the total of Rae's variable monthly expenses?
3. Make a budget using total variable and fixed monthly expenses and determine the amount to be reserved for annual expenses.	Have students analyze their budgets to make decisions about possible lifestyles. Can they afford vacations, six weeks without income, goind to school, getting married?	3. Using a prepared budget sheet fill in variable monthly expenses, fixed monthly expenses, annual expenses. Determine a monthly spending plan based on the subtotals and total.